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Tournament-Related Anxiety in Professional Female Tennis Players: An Application of the Transactional Model of Stress and Coping

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Tournament-Related Anxiety in Professional Female Tennis Players: An Application of the Transactional Model of Stress and Coping

by

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Tournament-Related Anxiety in Professional Female Tennis Players: An Application of the Transactional Model of Stress and Coping

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Purpose: The purpose of this dissertation will be to identify a conceptual model to describe the stress and coping process among a group of elite female tennis players during a high stakes performance situation. The Transactional Model of Stress and Coping (TA model) served as the theoretical basis for this dissertation. Structural equation modeling was used to analyze the indirect effect of social support, dispositional coping, coping strategies, tennis ability and cognitive appraisal upon competitive state anxiety.

Significance of the investigation: The WTA Tour, the governing body of professional tennis, has identified the priorities of promoting career longevity, development of a balanced athlete, the attainment of a profitable career for its athletes and protecting the TOUR's most valuable commodity, athlete health (AEC Report, 1995). The findings of this investigation serve to guide future interventions for managing stress and coping among elite athletes. This is one of the first investigations with this under-studied population and therefore, contributes to the available body of knowledge in stress and coping among elite athletes.

Methods: Ninety-four female tennis players responded to the Competition Questionnaire during a high stakes athletic competition. Questions addressed dispositional coping

strategies, current coping strategies as well as perceived competitive state anxiety and perceived sense of social support. Measurement models were used prior to construction of sub-models based upon TA model theory. Goodness of fit was assessed with significant path scores retained to construct a final conceptual model.

Findings: The Competitive State Anxiety Inventory-2 was supported as a measure of competitive state anxiety. A parsimonious measure of primary appraisal and secondary appraisal was found for this elite group of athletes. Results yielded support for the strong effect of primary appraisal upon increased competitive state anxiety. In addition, both social support and secondary appraisal demonstrated a significant effect with lower competitive state anxiety. Tennis ability as measured by current rank did not have a significant effect upon appraisal, coping strategies nor competitive state anxiety.

Conclusions: Based upon these results, a variation of the TA model as constructed within this investigation was found to be relevant for this elite group. The constructed conceptual model can be used to guide current and future interventions by health care practitioners that interact closely with these athletes during high stress competitive events. Implications for future interventions with this population include the need for enhancement of challenging appraisals and the need for restructuring of threatening appraisals. Though caution must be used when generalizing results, findings add to the body of knowledge regarding this under-investigated population. Future investigations could focus upon replication of results, investigation regarding the function of social support and the comparison of specific coping strategies used by subsets of athletes within this population.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

Professional female tennis players competing on the Women's Tennis Association (WTA) Tour experience chronic and acute stressors throughout the year. This under-investigated population (Woodman & Hardy, 2003) presents an ideal opportunity to assess the relationships of the variables within the transactional model of stress and coping (TA model) initially described by Lazarus and Cohen (1977). The primary aim of this dissertation is to investigate the effects of a high stakes competitive event (acute stressor) upon an indicator of stress—state anxiety. In addition, a valid means to measure cognitive appraisal is limited for this population. Thus a secondary aim of this dissertation is to provide a measure of cognitive appraisal for elite tennis athletes.

The following format will be used in the presentation of this proposal: Chapter 1 includes a general introduction; Chapter 2 includes a review of the literature; Chapter 3 includes the methodology; Chapter 4 presents the results and discussion; and Chapter 5 presents the implications and conclusion. The paper also includes a section for references and appendices with copies of relevant measurement instruments.

Overview

Lazarus and Folkman (1984) define a stressor as a demand made by the internal or external environment that upsets an individual's homeostasis, affecting their physical and psychological well-being and requiring actions to restore balance or equilibrium. All humans experience stress. Elite athletes are no exception (Anshel & Wells, 2000; Hardy & Riehl, 1990; Pensgaard & Roberts, 2000; Smith, Smoll, & Ptacek, 1993; Woodman & Hardy, 2003). The frequency, duration, and degree of stress have been shown to

detrimentally affect health by predisposing one to injury and illness, impairing performance due to distress, as well as prolonging the length of recovery from injury (DeLongis, Folkman, & Lazarus, 1988; Kelmann & Gunther, 2000; Smith, 1986). The manner in which an individual copes with stress can exacerbate, prolong, or alleviate the physical, emotional, and psychological effects of stress (Epel, McEwen & Iskovics, 1998; Folkman, Dunkel-Schetter, DeLongis, & Gruen, 1986; Tomaka, Blaskovich, Kelsey, & Leitten, 1993). Different variables such as social support, coping style, and appraisal have been shown to temper the deleterious effects of stress in non-athlete samples (Dolbier, 2000; Tsuchiya & Nakagomi, 1994); however, there is a dearth of information regarding the ability to affect these variables among elite athletes (Anshel & Wells, 2000; Kaissidis-Rodafinos & Anshel, 1997; Woodman & Hardy, 2003). Although athletic-related stress can be chronic or acute, there has been less attention focused upon acute stress among elite athletes (Anshel, 2000b; Anshel & Gregory, 1990; Ryska, 1993a), with even less investigation regarding acute stress management programs among this population (Anshel, 2001d).

Acute stress in sport can have a physical basis, such as a direct blow during a competition, or a cognitive basis, such as confusion from a coach's yelled instructions, or both. This latter often results in a perception of threat that can be experienced as state anxiety, which can be manifest through both cognitive and somatic responses (Martens, Burton, Vealey, Bump & Smith, 1990; Raglin & Hanin, 2000). Specifically, this sense of threat can result in negative patterns and unpleasant emotions, as well as uncomfortable

or dangerous physical responses that include hyperventilation, bronchial spasm, muscle tightness or spasms, injury, depressed mood, and even paranoia (Raglin & Hanin, 2000).

A sport-specific construct and subcomponent of anxiety is competition-related state anxiety (Martens, 1977). Also known as competitive state anxiety, it is defined as the physiological and cognitive manifestation of perceived threat in a performance situation. In a competitive situation, high levels of competitive state anxiety have been associated with increased fear, paradoxical performance or "choking" (Ryska, 1993a), decreased confidence, self doubt, and unfavorable expectancies of success (Anshel & Gregory, 1990; Carver & Scheier, 1981; Woodman & Hardy, 2003). Physical manifestations of state anxiety are similar to those described with anxiety; however, they occur within the context of a performance situation.

Anxiety is the perception of threat that produces both a cognitive and physical experience (Cox, Martens, & Russell, 2003; Ryska, 1993a). State anxiety is a useful means to assess the acute effects of competition-related stress in athletes. There are various reasons why an athlete can perceive an athletic event as threatening. The athlete can possess fear about executing skills during a match. There is the potential to lose points or money, or the potential to create difficulty with a sponsor; however, feelings of threat are separate from one's perceived ability to cope with the situation. Therefore, some athletes may view an event to be threatening, but are confident in their ability to cope with it, while others feel that they are unable to deal with the threat. One means of reducing this sense of threat during competition, or this competitive state anxiety, is through enhanced coping (Anshel & Gregory, 1990; Ntoumanis & Biddle, 1998).

When experiencing competitive state anxiety, an individual can respond unproductively with worry and persistent preoccupation, resulting in higher anxiety and arousal. Conversely, an individual could use enhanced coping, which would entail possible adjustment or removal of the stressor, reappraisal of the event, mental imagery, relaxation training, or control of the individual's somatic and cognitive responses. In addition, differences in perceived coping strategies, experience, standards of competition, appraisal, or social support can moderate the threat that is experienced in a competition (Anshel & Anderson, 2002; Anshel, Jamieson & Raviv, 2001; Martin & Hall, 1997; Rutherford & Endler, 1999; Ryska, 2003; Woodman & Hardy, 2003).

Although they have yet to be applied to a sample of elite athletes, these relationships have been investigated in non-athlete samples and are represented in the transactional model of stress and coping (Leman & Glanz, 1997). The transactional model of stress and coping, illustrated in Figure 1, is the basis of this dissertation and illustrates the inter-relatedness of variables that lead to varying coping outcomes. The main categories of coping outcomes include emotional well-being, functional status, and health behaviors (Glanz, et al., 1997), with an additional and equally important category, perceived cognitive functioning (Ryska, 1993b; Zeidner & Hammer, 1992). This dissertation will focus on the outcome of emotional well-being in the form of competitive state anxiety.

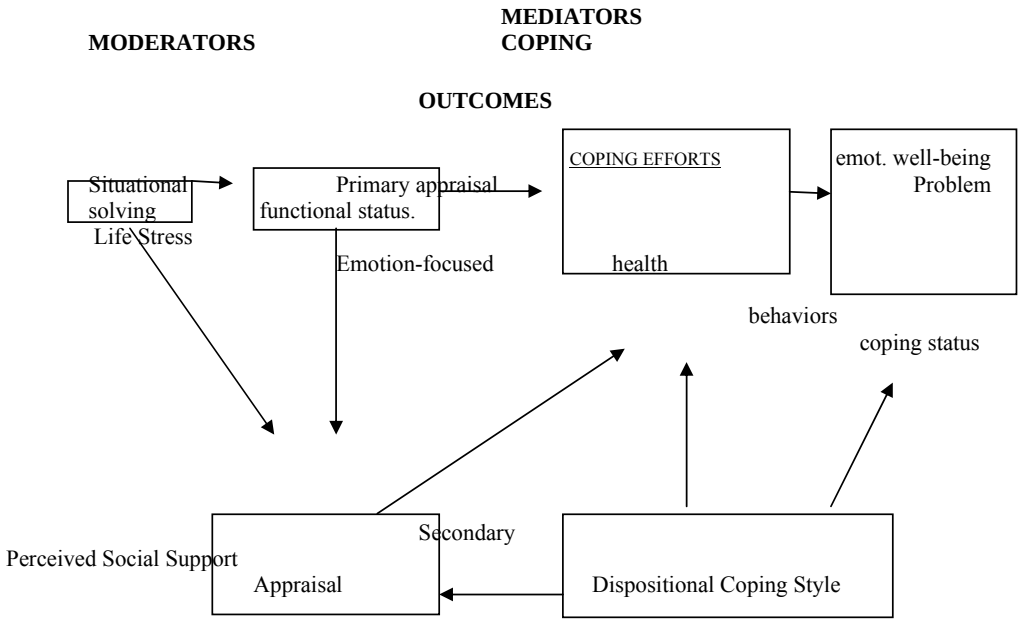


Figure 1. Transactional model of stress and coping (Leman & Glanz, 1997)

For the purposes of this dissertation, the above model is adjusted to incorporate anxiety as the dependent variable and manifestation of cognitive functioning. Specifically, competitive state anxiety is a multi-dimensional construct that provides a measurable outcome of coping strategies. It differs from trait anxiety in that it is an acute (sudden onset) manifestation of a person's current mental state and not necessarily a

description of their usual response to the performance situation. Therefore, competitive state anxiety is relevant to this population because it has been demonstrated to be higher among elite athletes (MacGregor & Abrahamson, 2000).

In a recent meta-analysis, Woodman and Hardy (2003) found a significant negative effect of the cognitive dimension of competitive state anxiety upon performance. Theories to suggest the mechanism of this effect have included distraction and lack of focus upon task (Sonstroem & Bernardo, 1992; Williams & Andersen, 1998) as well as variations in appraisal (Rutherford & Endler, 1999). Therefore, competitive state anxiety is relevant to this population as a variable of interest due to its demonstrated detrimental impact upon cognition and performance (Woodman & Hardy, 2003). The model depicted in Figure 2 also incorporates an additional path of tennis ability, which is meant to reflect experience. This is added based upon the finding that an increased level of experience is negatively related to heightened cognitive anxiety (MacGregor & Abrahamson, 2000). The resulting model is presented in Figure 2. It incorporates each of the components of the transactional model of stress and coping with the additions listed above. The model shows the simplified structural equation model (without error terms) with the relationships between social support, coping styles, and coping strategies in addition to the individual factor of "current rank" as the measure of tennis ability upon the outcome of state anxiety.

This fully hypothesized model contains 61 parameters, 19 of which are fixed and 42 of which are freely estimated, with a total of 63 degrees of freedom. Using the SAS macro for power analysis (MacCallum, Browne, & Sugawara, 1996), with alpha = .05

and beta = .20, obtained RMSEA =.08 and the null model RMSEA =.00, a minimum sample size of 98 should provide sufficient power for the model's x^2 test.

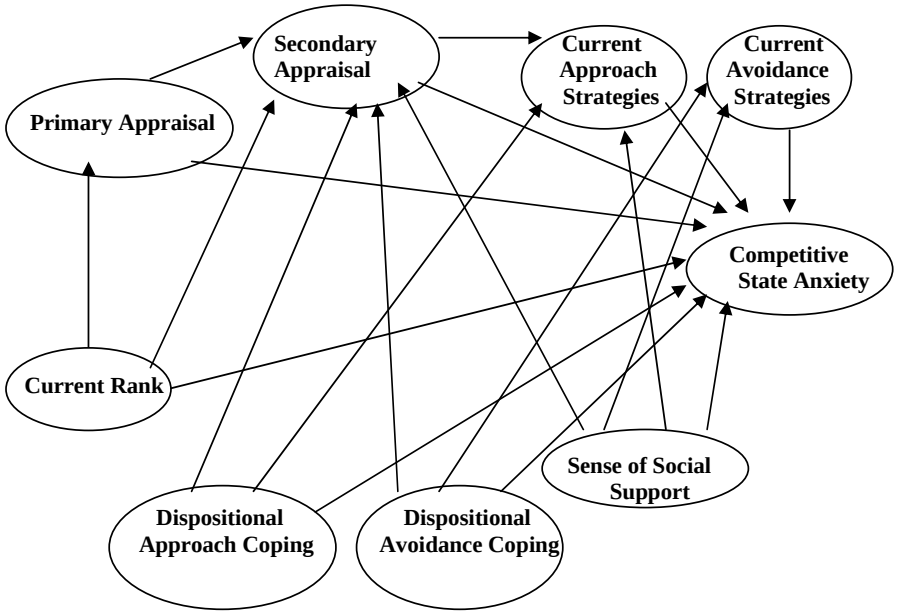


Figure 2. Full hypothesized model based upon TA model.

Purpose

The purpose of this dissertation is to construct a theory-based conceptual model by using structural equation modeling (SEM) to assess goodness of fit of relevant sub-models based upon the transactional model of stress and coping (TA model). This investigation is exploratory in nature, due to the lack of empirical evidence available with

this population. The final conceptual model will provide insight to the process of stress and coping within a population of professional female tennis players during a major tennis competition.

Structural equation modeling (SEM) was used to investigate the relationships of the variables within the TA Model— social support, dispositional coping, coping strategies, tennis ability, and cognitive appraisal—upon the outcome variable of interest, competitive state anxiety. Causal pathways from the variables of social support, tennis ability, and coping upon the outcome variable of state anxiety were explored. As can be seen by the diagram depicting the potential causal pathways between variables (Figure 2), the TA model is complex in nature. Further assessment of the TA model within this population may allow for the elimination of variables, making this model easier to study and enhancing its clinical relevance. This investigation also evaluates an appropriate measure of cognitive appraisal within this population.

Statement of the Problem

Female professional tennis players, like other athletes, are exposed to stressors during competition and training. Unfortunately, there is a dearth of information regarding this population, due to the limited access for investigation. A Grand Slam event, with its expanded media attention, additional family presence, and high stakes in potential point value and monetary gain, provides a unique opportunity to study stress within this population. The TA model provides a theoretical framework by which to assess the effects of social support, dispositional coping, current coping strategies, tennis ability, cognitive appraisal, and well-being as manifested by cognitive state anxiety.

Significance of this Study

This investigation is an extension of the TA model to a high stakes professional tennis event. A review of literature suggests that there has been little or no research done within this population. Such an event necessitates that an athlete deal with acute stressors to control competitive state anxiety. The use of the TA model as a theoretical basis to examine this process can significantly add to our understanding of elite athlete behavior. In addition, the WTA Tour has identified the priorities of promoting career longevity, development of a balanced athlete, the attainment of a profitable career for its athletes, and protecting the Tour's most valuable commodity, athlete health (AEC Report, 1995). This dissertation is intended to contribute to the knowledge base that is used to design interventions for these women.

Analytical Strategies

Analytical strategies focused on the extent to which individual differences in athlete's social support, coping skills, appraisal, and tennis ability—singly and in combination—are related to the manifestation of cognitive state anxiety. The technique of SEM was used to construct measurement models and assess the direct and indirect relationships within the larger hypothesized model.

According to De Vellis (2003), determining the nature of latent variables underlying an item set is critical. For example, De Vellis makes clear that an assumption underlying alpha is that the set of items is unidimensional. Thus, it is important to determine which groups of items, if any, constitute a unidimensional set. Therefore,

factor analysis was used to test the validity structure of the measurement instruments used within this investigation before proceeding toward full model construction.

Steps performed with the exploratory and confirmatory factor analysis (EFA & CFA) are as follows:

1. Factor loadings for items were obtained in order to identify the relevant indicators of the latent variables of the model. Three indicators are needed in order to define a latent variable, and if a scale used was unidimensional, the items were packaged as three random parcels and assessed for loading magnitude. Items with factor loadings less than .30 were automatically dropped due to low loading. Cronbach's α levels for the indicators were to exceed .50. The goal for the first step of model analysis was to retain a measurement model with minimum item factor loadings above .30 and minimum Cronbach's α values of .50 deemed as acceptable.
2. Once the measurement model was constructed and its theoretical latent variables were verified by the associated indicators, the goodness of fit was tested. Acceptable indices of fit used were the same for the measurement models as with the final constructed conceptual models, specifically, a CFI value greater than .90 (Bentler & Bonnett, 1980) was considered indicative of acceptable fit, with a value greater than .95 indicative of close fit. A RMSEA below .08 was to be considered a "reasonable fit" of the model, with <.05 a "close fit" (Browne & Cudeck, 1993). The Chi-square statistic is also reported as a goodness of fit index.

3. Models of misfit would indicate an inappropriate or poor measurement instrument for this population and therefore, were discarded.
4. With the measurement models confirmed, the final conceptual model, based upon the relationships within the TA model hypothesized by theory, was constructed and then evaluated for goodness of fit.
5. With the final larger conceptual model, the same parameters for goodness of fit were used as with the measurement models. Standardized path scores were also assessed for level of significance ($p < .05$).

Primary Outcome

The primary outcome of this dissertation is a theory-based conceptual model constructed using SEM to assess goodness of fit of relevant sub-models and based upon the TA model of stress and coping (Lazarus & Folkman, 1984).

Null Hypothesis

The proposed sub-models will not be supported when applied to an elite athletic population of professional female tennis players.

Secondary Outcome

Item analysis of current instruments used to measure cognitive appraisal yielded evidence to support one as an appropriate measure within this population.

Operational Definition of Terms

Coping

Lazarus and Folkman (1984), define coping as cognitive and behavioral efforts to manage situations appraised as taxing or exceeding personal resources. In this study, this construct was delineated between coping efforts and dispositional strategies. Current coping efforts were operationalized as approach and avoidance coping scores on the Brief Coping Orientations to Problems Experiences (Brief COPE) Inventory (Carver & Scheier, 1990), with items structured to reflect situational concurrent activities. Dispositional coping was also operationalized as approach coping and avoidant coping scores on the Brief COPE; however, items were formatted to mirror habitual coping strategies undertaken in the past. The Brief COPE is a 28-item self-report questionnaire that assesses the different ways in which an individual responds to stress.

Cognitive Appraisal

According to Lazarus and Folkman (1984), this construct is the process of labeling an encounter with respect to its significance for an individual's well-being and is composed of primary and secondary appraisal.

Primary Appraisal

This is defined as the degree to which a situation is perceived as relevant to an individual's well-being (Tomaka, Blascovich, Kibler & Ernst, 1997). In this study, primary appraisal was operationalized as a response to a 5-point Likert scale question with responses ranging from 1 (*not at all*) to 5 (*a great amount*). The question was: "How much of a threat (pressure) do you feel this tournament presents to you?

Secondary Appraisal

This is defined as the perceived ability that an individual brings to impact a situation. Secondary appraisal was operationalized by the response to the question "How able are you to cope with this situation?" using a 5-point Likert scale with responses ranging from 1 (*not at all*) to 5 (*a great amount*; Tomaka et al, 1997).

Sense of Support

This can be defined as an individuals' perception of the quantity and quality of the social support available to them. This is a more global view of one's resources and therefore, not dependent upon a match between a stressful event and a specific functional aspect of social support (Dolbier, & Steinhardt, 2000). Social support can decrease the appraisal of threat in a situation (Cohen & Wills, 1985).

Coping Outcome

This was operationally defined as a situation-specific construct developed by Martens (1977), namely competitive state anxiety, that reflects differences in the tendency of an individual to respond to competitive situations with somatic and cognitive symptoms of threat. This was measured using the Revised Competitive State Anxiety Inventory (Martens, 2003), with a low score indicative of low state anxiety.

Tennis Ability

This was operationally defined as an athlete's tennis rank, in other words, current rank.

State Anxiety

This is the acute transitory response to perceived stress with feelings of apprehension and tension that can contain a somatic element of elevated autonomic nervous system arousal.

Limitations

This is a quasi-experimental design with single point data collection. This design limits the ability to draw cause-effect conclusions. The short duration of assessment limits threats due to mortality, history, and maturation. An instrumental effect or threat via testing is possible because the questionnaire was completed in the presence of the investigator. However, attempts were made to control these effects by repeat assurance of confidentiality and removal of personal identifiers as soon as data were collated.

Scales used to assess coping styles (Brief COPE), perceived social support (Sense of Support Scale), and the Revised Competitive State Anxiety Inventory (CSAI-2R; Cox et al., 2003), are all self-report scales and therefore, subject to confound due to social desirability. This limitation was controlled using reassurances of confidentiality to the participant and separation of identifying information from the answers submitted by participants.

The population of professional female tennis players is an elite and select group. Though testing of the TA model within this group can provide insight to the process of

stress and coping, the limited size of the entire population is a threat to the validity of findings within this investigation.

Delimitations

The participants in this study are representative of the professional tennis players that compete on the tennis circuit throughout the year. The players that participated in this study had competed on the Tour at least one year, had played a minimum of 17 tournaments per year, and ranged in age from 18-47 years. Given the differences that exist between athletes and non-athletes, caution should be displayed in generalizing these results beyond these participants. In addition, it is possible that the traits and experiences that set this sample apart from the general population of athletes may interact with the variables to be studied and therefore produce results that lessen the ability to generalize findings from this study.

CHAPTER 2: REVIEW OF LITERATURE

Over the last decade, there has been increased interest in the processes athletes and others use to cope with stress (Anshel, 2000; Carver, Scheier, & Weintraub, 1989; Moos, 1986; Smith, 2001; Wells, 1995). This work is built upon the foundation of stress and coping investigation provided by Lazarus (1966) with subsequent work by Lazarus and Folkman (1984). Research designs continue to increase in rigor and provide results to facilitate the understanding of the impact of stress and coping upon emotion, well-being, and the role of motivation and intent (Lazarus, 2000). Unfortunately, there is a dearth of information regarding elite athletes and coping processes (Woodman & Hardy, 2003). There is, as a result, a need to extend these investigations to the athletic population.

Part of the challenge associated with studying stress and coping is the fact that stress can be defined as an event, a process (Lazarus & Folkman, 1984), and an outcome (Lazarus, 2000). Lazarus has argued that stress consists of three processes, namely primary appraisal, secondary appraisal, and coping. Primary appraisal is the process of determining that a threat exists in relation to oneself; whereas secondary appraisal is the process of focusing upon the ability to enact a response to a threat. Finally, coping is the process of executing a response to the stressor. This multi-component process called stress would be most easily defined as a linear relationship; however, Lazarus notes that the outcome of one of these processes may entail regression or return to a prior process. For example, if a coping response appears to be inadequate, the individual may reappraise the potential response; or, if an individual realizes that they have a readily available means to cope with a stressor, he or she may reassess the stressor as less threatening (Carver, et al., 1989).

Lazarus' conception of stress as a series of processes differs from the General Adaptation Syndrome (GAS) offered by Hans Selye (1982). In defining the GAS, Selye described the biological components of the stress response with more emphasis upon the physical adaptation to stress and less emphasis on the inter-relatedness of the cognitive processes and situational/environmental factors that affect the organism's response to stress. Conversely, Lazarus and Folkman (1984) emphasize the constant cognitive reappraisal and dynamic, even reciprocal nature of the stressful event and stress response. Stress is best conceived, therefore, not as a linear event, but as a process comprised of reciprocal relationships within this process.

The varied definitions of stress have confounded the investigation of stress and coping (Coyne & Downey, 1991). Specifically, the antecedent and consequent measures are essentially the same. For example, stress as the antecedent variable of interest is often considered as an event that causes the individual to respond with the initiation of the appraisal and a physiological response as an outcome. However, given their overlap, any correlation amongst them would represent at least some degree of redundancy rather than a causal explanation. In this case, stress appraisal is actually summative to the original stressor and in this manner precedes a subsequent stress response. Cause and mediating relationships can therefore be difficult to separate, due to the summative and dynamic nature of stress.

The issue of confounded measurement has been troubling for many psychological constructs (Lazarus, 2000). However, the circularity associated with correlation research involving social and psychological processes, particularly stress and coping, is difficult to avoid (Lazarus, DeLongis, Folkman, & Gruen, 1985). The recent advances in structural

equation modeling (SEM), as a more powerful extension of path analysis, provide the opportunity to assess direct and indirect effects of the antecedents as well as moderators and mediators of stress. This approach to quantifying the relationships between a stressful event and coping will be delineated further within this research project. Investigations to measure response to life events illustrate attempts to control and account for confounding variables in stress measurement.

Acute Versus Chronic Stress

Stress as an event, or rather a stressor, is experienced as a one time occurrence, a repeatedly occurring event, or a continuous event. Therefore, stress can be defined as acute—occurring during one instance or over a short period of time—or as chronic—occurring repetitively over an extended period of time. There is, however, variability with regard to the time period that delineates these categories. Suls and Fletcher (1985), within their meta-analysis, defined acute stress as occurring once or several times within a 5-day period and chronic stress as lasting between 5 days and 2 years. Despite such arbitrary boundaries, it would be safe to say that acute stress, similar to acute exercise, occurs in shorter bouts and, therefore, does not allow for permanent physiological changes to occur, while chronic stress is associated with lasting adaptations.

Canon and Rosenbleuth (1937) are credited with identification of the *fight or flight* response by the body to stress, in which an individual will respond to challenge with a recruitment of energy to either aggress and act upon the stressor or flee to safety. There are two means by which the physical stress response is implemented: the sympathetic-adrenal medulla pathway (SAM) or the hypothalamic pituitary adrenal cortex axis (HPA). The action of the sympathetic system, or SAM pathway, as an initial

response to a stressor is to release catecholamines. Hormones such as epinephrine and norepinephrine increase arousal and promote the release of fatty acids from the liver for quick energy supply. There is vasoconstriction of pupils and blood vessels, with an increase in heart rate and blood pressure to promote quick transport of energy and oxygen through the blood. All this results in quick provision and delivery of substrate to promote a physical response to the stressful event (Sapolsky, 2001).

In addition to the SNS activity, there also exists a slower reacting process enacted by HPA activity in response to long-term and unpredictable or novel events, when the energy need, both in duration and quantity, is uncertain (Dienstbier, 1991). Cortisol is primarily active in the HPA stress response. Acutely, cortisol facilitates greater energy availability by the direct stimulation of gluconeogenesis. Over time, cortisol promotes energy availability through catabolism—the breakdown of muscle protein into amino acids, lipolysis of triglycerides into free fatty acids, and continued direct stimulation of gluconeogenesis (Sapolsky, 2000). In addition, vegetative functions such as sleep, immune response, digestion, and reproduction will be temporarily terminated by the parasympathetic system or the HPA (MacArdle, Katch, & Katch, 2001; Sapolsky, 2001).

Although it is a physical response, the body will maintain the stress response regardless of whether the stressor is real or perceived (Covey, 1989). Thus, the physical stress response occurs whether the stressor is physical or psychological, real or imagined. Repetitive acute stress or unalleviated (chronic) stress promotes the maintenance of the stress response, leading to physical deterioration as well as mental fatigue and burn-out (Anshel, 1990, 2002; Smith, 1986). The deleterious effects of acute and chronic stress upon health have been described by several investigators (Folkman, Lazarus, Gruen, &

DeLongis, 1986b; Sapolsky, 2000; Smoll & Smith, 1990). Specifically, as the sympathetic system responds to an acute stressor that the individual perceives as a threat, there is mobilization of energy, i.e., mobilization of substrates from the liver and muscle to meet the perceived demand of threat. Sapolsky (2001) asserts that if the stress response is stimulated too often, repetitive mobilization results in lost energy or inefficiency with mobilization, resulting in premature fatigue. An individual that responds to stressors with a large acute stress response repetitively over time will tire more easily due to the loss of potential energy that occurs with each mobilization of substrates. The stress response will cease only when there is intervention to relieve the stressor or the perception that the stressor has decreased.

The stress response is a life-saving, evolutionarily preserved response that promotes survival and when managed effectively can enhance development and performance (Dienstbier, 1991; Loehr, 1994; Richardson, Neiger, Jensen, & Kumpfer, 1990). It is well established that acute bouts of stress are beneficial for a system or individual. Sapolsky (2001), and other investigators have emphasized that acute bouts of stress make one physically stronger (Dienstbier, 1991) and more mentally resilient (Covey, Merrill, & Merrill, 1994; Loehr, 1994; Richardson, et al., 1990). This is, for example, the basis of the principle of overload training for strengthening and conditioning in sport (MacArdle et al., 2001). However, without benign or challenging cognitive appraisals, without coping strategies, such as problem-solving or empowering interpretations (Covey, 1989; Richardson et al., 1990), and without social support, acute stress can promote deleterious physical consequences, such as injury (Andersen & Williams, 1989) and insulin resistance (Sapolsky, 2000). In addition, with limited coping

strategies, stressors can be perceived as threatening and result in negative mental consequences such as depression and anxiety (Folkman et al, 1986b; Martens, Burton, Vealey, Bump, & Smith, 1990; Ryska, 2003). Thus, it is not the stressor itself, but the full process of stress that must be considered to understand the negative outcomes. This perspective has influenced the research involving negative life events.

Life events cause stress and can affect a person's physical and psychological functioning (Billings & Moos, 1981; Junge, 2000; Passer & Seese, 1983; Williams & Roepke, 1993). Undesirable or negative life events have been associated with increased incidence and severity of injury (Smith, Smoll, & Ptacek, 1990), increased physiological symptoms, and increased illness (Anshel, 1996). However, these stress-causing life events do not necessarily produce long-term negative effects (Andrews & Tennant, 1978), nor must these events be negative to cause stress and upheaval. For example, the initial research demonstrated only a small association between life events stress and outcome measures (Bramwell, Masudor, Wagner, & Holmes, 1975; Passer & Seese, 1981). Further clarification has been provided by the association of negative life events to injury (Petrie, 1993) and moderator variables working in conjunction with life stress such as social support (Smith, et al., 1990). Although all studies with American football have demonstrated a significant relationship between negative life events and injury, this has not been true for other sports such as volleyball and basketball (Hammermeister & Burton, 2001). The results have been varied due to the confounds of type of sport upon the frequency of accidents as well as lack of sample description (in some cases) to account for variations in methodology. A definitive answer with regard to life stress has been difficult to attain, with investigators noting that the means used to obtain life stress

data may be at fault. This lack of consistency regarding a strong effect has led others to suggest that coping may be a critical factor or even more important determinant of outcome than the function and severity of the stressor per se (Zeidner & Hammer, 1990). Within the TA Model, life stress and situational stress drive the appraisal process by affecting secondary appraisal, to include variables such as self-efficacy and perceived control (Glanz et al. 1997; Zohar & Dayan, 1999). Situational and life stress would also directly affect secondary appraisal and the coping styles of approach and avoidance coping (Cassidy, 2002). There has been increased interest in the manner in which individuals manage or cope with life events that may affect the realization of deleterious outcomes (Billings & Moos, 1981). Investigations indicate that close, personal relationships, also known as social support, contribute to a person's ability to cope with stressful life events and life transitions (Coyne & Downey, 1991). Social support appears to function in conjunction with coping to moderate the effects of life stress upon injury (Smith, et al., 1990). In addition, factors such as age, gender, intelligence, interpersonal resources, and even birth order contribute to the relationship between coping and adaptation (Martin & Craig, 1997). It has, as a result, become apparent that coping is a major factor predicting the response to acute and chronic stressful events that affects an individual's psychosocial adaptation and, subsequently, their performance.

Manifestation of Stress

Anxiety has been defined as an emotional reaction to a stressor that is perceived as dangerous (Spielberger, O'Neil, & Hansen, 1972). Although this definition focuses upon emotion, the definition of anxiety has since been expanded to consist of both somatic and psychological components (Martens, et al. 1990; Raglin & Hanin, 2000).

Spielberger's initial definition also uses the term *danger*; however, more recently investigators (Cox, Martens, & Russell, 2003; Ryska, 1993a) have used the term *threat* when defining anxiety. Therefore, anxiety can be considered the physical, cognitive, and emotional response to the perception of threat. Specifically, perceived threat can result in dysphoric thoughts and emotions as well as unpleasant physical changes such as heart palpitations, shortness of breath, and injury (Raglin & Hanin, 2000).

Although anxiety has been associated with increased arousal, it is important to note that is more than just arousal. The cognitions associated with anxiety, such as worry, distraction, and preoccupation with potential loss and potential harm, suggest that anxiety is far more than the physiological fight-or-flight response to a stressor. Thus, anxiety is considered to represent a specific sub-set of the stress response that includes both the physical stress response of increased arousal, along with negative cognitive ideations that center on the source of threat (Caruso, Dzewaltowski, Gill & McElroy, 1990; Cox, et al., 2003; Martens, et al., 1990).

Competition-related state anxiety is a construct initially defined by Martens (1977) to describe the physiological and cognitive manifestation of perceived threat in a performance situation. Psychological states can change from moment to moment and therefore, state anxiety is a construct used to describe the intensity of anxiety at a given time (Raglin & Hanin, 2000). High levels of state anxiety during a performance situation have been associated with increased fear, paradoxical performance or "choking" (Ryska, 1993a), self doubt, unfavorable expectancies of success, and decreased confidence (Anshel & Larry, 1990; Carver & Sheier, 1981). Physical manifestations of state anxiety include trembling and twitches in muscles, visual distortion, nausea, vomiting, and

diarrhea (Caruso et al., 1990; Harris & Harris, 1984). Competition-related state anxiety should not be confused with excitement prior to or during competition. While excitement is expected to promote physical performance, particularly on a well-learned task, increased state anxiety during competition is, by definition, harmful, diminishing performance and, if experienced on a chronic level, may lead to staleness and burn-out in sport (LeUnes & Nation, 1996; Loehr, 1994; Martens, et al., 1990). In addition, Andersen and Williams (1988) have developed an injury model based upon the hypothesis that high competitive state anxiety can limit focus upon relevant cues, thereby leading to physical injury. An investigation with a sample of 67 collegiate athletes with levels of competitive state anxiety demonstrated decrements in performance, with the largest decrements observed in athletes when competitive state anxiety was one standard deviation above or below their zone of optimal performance (Turner & Raglin, 1996). In a recent meta-analysis, a significant effect size (r = -0.10) for the cognitive component of state anxiety was found, with results supporting the multi-dimensionality of competitive state anxiety (Woodman & Hardy, 2003). The documented associations between high state anxiety and negative physiological and psychological long term outcomes illustrate the importance of decreasing competitive state anxiety in acute and chronic stress situations (Anshel, Brown & Brown, 1993).

Because competitive state anxiety is a manifestation of stress in a performance situation (Anshel, Jamieson, & Raviv, 2001; Anshel & Wells, 2000a; Anshel & Wells, 2000b; Martens et al. 1990; Ryska, 1993b), one means of reducing its impact is through successful coping (Ntoumanis & Biddle, 1998). When experiencing competitive state anxiety, an individual can respond unproductively with worry and persistent

preoccupation with the threat, resulting in the creation of higher anxiety and arousal. Conversely, an individual could use enhanced coping, which would entail possible adjustment or removal of the stressor, reappraisal of the event, or control of the individual's somatic and cognitive responses (Aldwin & Revenson, 1987; Anshel & Anderson, 2001; Anshel, Williams & Williams, 2000; Coyne & Downey, 1991; Ntoumanis & Biddle, 1998; Taylor, 1987). The level of competition-related state anxiety will be modified along with the athlete's perception of threat (Anshel & Larry, 1990). For example, an intervention was developed to teach male baseball and female softball intercollegiate athletes cognitive strategies to cope with receiving unpleasant feedback. Within this investigation, the two other randomly assigned groups received a placebo and no-treatment (Anshel & Larry, 1990). The strategies taught included control of emotions, organizing and filtering feedback information, planning of responses, and executing responses. This COPE intervention, as named by Anshel and Larry, was developed to assist athletes to deal with the acute stressor of negative feedback, with those who received the intervention demonstrating less fear of appearing incompetent, less fear of negative evaluations, and a maintained sense of control over their baseball future.

In a similar experiment to decrease the negative repercussions to acute stressors in the athletic environment, athletes again either received cognitive strategy education, placebo treatment, or progressive relaxation training (Anshel, et al., 1993). Results indicated superior motor performance on a dart tossing task and reduced muscular tension (as measured by EMG) for the group that received the cognitive strategy training, in contrast to two other groups that demonstrated no significant difference in performance or EMG activity.

The cognitive component of state anxiety is reflected in the TA model, particularly for elite athletes. The life of an elite athlete, specifically the female professional tennis player, is associated with a variety of acute stressors throughout the competitive year. This is particularly true during high stakes events, in which athletes must cope with a number of acute stressors regarding the viability of their professional career. The range of stress and coping interactions provides an ideal opportunity to test the TA model; however, a more in-depth discussion of this model is needed to facilitate an understanding of the context within which to view the components of the stress response.

Transactional Model of Stress and Coping

The TA model was proposed by Lazarus and Folkman (1984) as a framework for evaluating an individual's attempt to cope with stress. Within this model, stressful experiences are defined as person-environment transactions, such that, the impact of an external stressor (demand) is mediated by the person's appraisal of the stressor and then by the person's psychological, social, and cultural resources at his or her disposal (Cohen & Willis, 1995; Lazarus & Cohen, 1977). The components of the model, as illustrated in Figure 3, are primary appraisal, secondary appraisal, and coping efforts, along with outcomes and moderators such as social support and dispositional style. Leman and Glanz (1997) also describe this model to include Albert Bandura's (1984) construct of self-efficacy as a component of secondary appraisal. This model is central to the proposed investigation and will be discussed in further detail.

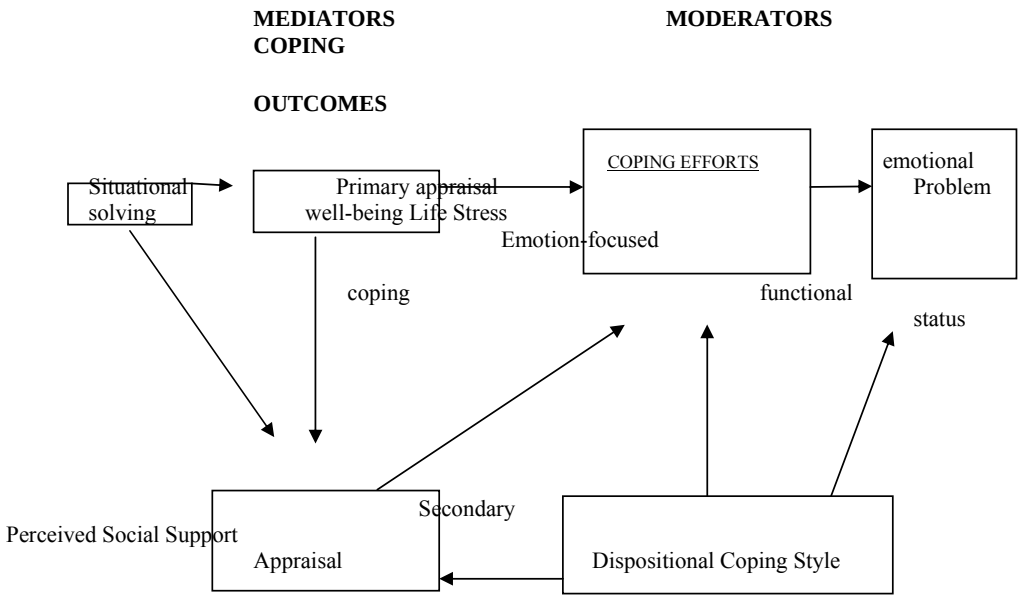


Figure 3*. Transactional model of stress and coping (adapted from Leman & Glanz, 1997)*

Cognitive Appraisal

Cognitive appraisal comprises two processes, namely primary and secondary appraisal. Folkman and Lazarus (1985) state that these processes are interdependent. Primary appraisal is a person's judgment about the significance of an event. The individual determines whether an event is irrelevant, benign, or stressful (Folkman & Lazarus, 1985). An irrelevant encounter has no significance for an individual's well-being. Stressful appraisals however, can potentially impact well-being and are characterized by challenge or threat. Threat refers to possible harm or loss, and challenge

presents the opportunity for mastery, gain, or personal growth (Folkman & Lazarus, 1985).

Two components of primary appraisal are the perception of susceptibility to the threat and perception of the severity of the threat (Leman & Glanz, 1997). Thus, these processes are based on conscious thought and not exclusively on physiological response (Anshel, 2004; Lazarus & Folkman, 1984). The construct of primary appraisal (Lazarus & Folkman, 1984) proposes that an individual will evaluate a situation in terms of its personal relevance. According to Zohar and Dayan (1999), an individual must determine the stakes or importance of the encounter outcomes followed by a determination of threat/harm/loss or challenge. Therefore, with primary appraisal, an individual makes an assessment of the "adaptational demands" needed (Zohar & Dayan, 1999). In this manner an individual determines how susceptible they will be to threat and how great the potential of threat or harm or challenge can be (severity). Primary appraisal answers the questions "Can this hurt me?" or "What can this do to me?"

Secondary appraisal is a person's assessment of their coping resources and available options (Cohen & Hoberman, 1983). Secondary appraisals address the question, "What can I do?" Components of secondary appraisal are perceived ability to change the situation (perceived control), perceived ability to manage one's emotions to the situation, and expectations about the effectiveness of one's coping resources (self-efficacy). If one perceives oneself as susceptible to the threat of illness or injury, that person may seek an evaluation or a screening for the illness; therefore, use an approach style of coping to

change or manage the stressor. A person may also seek to manage their response or emotion associated with the stressor such as talking or venting, thereby using an avoidance approach. Likewise, the effects of perceptions of control over illness and psychological adjustment have been demonstrated with illnesses such as cancer, HIV-AIDS, multiple sclerosis, and coronary heart disease (Mohr, Goodkin, Nelson, Cox, Weiner, 2002; Taylor, et al., 2000).

Given the dynamic nature of these constructs, the measurement of appraisal has proved challenging. In an effort to conceptualize the interactions between primary and secondary appraisal, investigators (Tomaka, Blaskowich, Kibler, & Ernst, 1997) have asked participants to answer a question regarding the primary appraisal of threat: "How stressful do you expect the upcoming task to be?" and a question regarding their secondary appraisal of coping resources "How able are you to cope with this situation?" These are both graded on a 5-point response scale ranging from 1 (*not at all*) to 5 (*a great amount*). Challenge appraisals are appraisals whereby the perception of harm (answer to Question 1), does not exceed the perceived ability to cope or perceived resources available (answer to Question 2; Dolbier, 2000; Tomaka et al, 1997). Therefore, challenged individuals will view the stressor or situation with the possibility of gain or avoidance of harm greater than the possibility of loss in the situation. Conversely, threat appraisals are appraisals whereby the perceived ability to cope (answer to Question 2) is less than the perception of harm or loss (answer to Question 1). The threatened individual will view the situation with the potential for loss and little if anything to be gained. The answer to these questions with slight variations has proven to be the most parsimonious

means to measure primary and secondary appraisal (Anshel & Wells, 2000a; Dolbier, 2000; Tomaka et al, 1997).

The approach to measuring cognitive appraisal of a stressful situation through the differentiation of primary and secondary appraisal is also supported by the investigation of the interaction between primary and secondary appraisal (Zohan & Dayan, 1999). In a sample of 675 students at 2 universities, the measurement of primary and secondary appraisal demonstrated main effects for each upon emotional reaction in a performance situation. The investigators used an instrument which incorporated an assessment of primary appraisal based upon "what is at stake" and secondary appraisal based upon "coping options." Although this approach supports the assertion that primary appraisal and secondary appraisal should be assessed together even though they are independent constructs, no validity or reliability data was reported for the instrument used (Zohar & Dayan, 1999).

The significance of the differentiation between threat and challenge appraisals is illustrated by the finding that threat appraisals are more strongly associated with negative emotional responses such as anxiety (Lazarus & Folkman, 1984) and disorganized mobilization of physiological resources (Dienstbier, 1991). These include moderate cardiac reactivity coupled with an increase in heart rate or no decline in overall systemic vascular resistance (Blaskovich & Tomaka 1996). In contrast, challenge appraisals are more strongly linked with positive feelings of eagerness and excitement (Folkman & Lazarus, 1985; Kobasa, 1982; Loehr, 1994). These occur when the situational demands are perceived as within the person's resources or ability to cope (Sapolsky, 2000; Tomaka, et al., 1997). It has also been found that challenged individuals may be more

task focused and less distracted by negative emotions than are threatened individuals (Csikszentmihalyi, 1990; Folkman, 1984; Loehr, 1994; Tomaka et al., 1993).

Coping

Coping is defined as an individual's attempt to manage an event or situation that taxes their resources (Lazarus & Folkman, 1984). Thus, coping is an accomplishment, whereby an individual accommodates or adjusts (be it well or badly) to environmental demands (Zeidner, 1996). According to Zeidner, coping is more than just a simple adjustment, "it is the process of human growth, mastery and differentiation allowing us to evolve in an ever-changing world" (p. 506).

Coping Efforts

Types Defined

Lazarus and Folkman (1984) state that the effects of primary and secondary appraisal are meditated by the coping strategies used. Their model originally categorized coping efforts into problem management/problem-focused coping/approach coping and emotion regulation/emotion-focused coping/avoidance coping. The terms *approach coping* and *avoidance coping* are used for this investigation. Avoidance coping is used to regulate the distressing emotions of a stressful encounter without addressing the source of stress. Approach coping is an attempt to improve or change the source of stress, which is producing the distressing emotions (Holohan, Moos & Shaefer, 1996; Lazarus & Folkman, 1984; Seligman 1998). Therefore, approach coping is an active means of coping. An individual uses problem management strategies directed at changing or managing the stressful situation. Avoidance coping efforts are attempted, not to alter the situation, but rather, to deal with the emotions induced by the stressor or to engage in

behaviors that result in the physical or psychological withdrawal from the source of stress (Anshel & Wells, 2000a). Examples of avoidance coping include minimizing threat, wishful thinking, and self-blame. Examples of approach coping include problem-solving and seeking information.

It is important to note that this model predicts that approach coping will be most adaptive and beneficial when the stressor is changeable. For example, if an individual calculates a tax return in January and discovers that they owe additional income tax and do not have the means to pay the owed taxes, an approach coping strategy would be to deliver pizzas, do extra consulting work, or get a loan in attempts to attain additional money to pay for this unforeseen debt. The individual is doing something to change the situation of insufficient funds to meet a debt. Conversely, avoidance coping can be most beneficial when the stressor is non-changeable or when all reasonable approach coping attempts have been made. One such situation would be the unexpected death of a loved one. The person cannot be replaced and, as a result, the survivors may resort to venting in order to dissipate their frustration and sadness. This strategy can help the individual deal with their emotional response despite not alleviating the stress. The objective ability to meet a challenge is irrelevant. Avoidance coping is, instead, considered adaptive when an individual perceives that their resources are insufficient to meet a stressor, whether this is true or not. Additionally, avoidance coping is adaptive until the emotion has been dissipated and the individual is ready to begin to use approach coping (Seligman, 1998).

Although these two functions of coping, namely, approach and avoidance, are independent, they function together in the stress process (Lazarus, 2000). Recent investigations have attempted to identify the use of approach coping versus avoidance

coping during events of acute stress (Anshel & Anderson, 2002; Anshel & Wells, 2000a; Kaissidis-Rodafinos & Anshel, 1997). In a study by Billings and Moos (1981), it was found that subjects who used more active attempts to deal with an event and less avoidance strategies experienced lower levels of measured stress. Of the individuals in this study, men reported less frequent use of avoidance than did women; individuals with higher educational status also tended to use active-cognitive coping with less avoidance coping strategies. Lazarus and Folkman (1986) have reported that an individual will tend to more commonly use avoidance coping when dealing with health issues and approach coping when dealing with stress in the workplace. These findings illustrate the variety of coping strategies and the potential complexity of the effects of coping strategies upon outcomes.

In an attempt to provide consensus regarding coping strategies, Suls and Fletcher (1985) conducted a meta-analysis regarding the relative efficacy of approach versus avoidant coping strategies. In actuality, subsequent research has found the distinction between approach coping and avoidance coping important but too simplistic (Carver, et al., 1989; Folkman, et al., 1986) with measurements scales constructed to distinguish the specific behavior into subscales that then within the larger two categories of approach and avoidance. For example, Carver and Scheier (1985) with their Brief COPE instrument, provide subscales for coping activities that can be divided into avoidance and approach coping (C. S. Carver, personal communication, September, 2004).

Although avoidance coping may be beneficial in the short term to deal with a stressful situation, it can increase state anxiety and negative affect (Carver & Scheier, 1994; Seligman, 1998). Specifically, Seligman emphasizes that long-term avoidance

coping can increase environmental stressors. Also, chronic use of avoidance coping results in adverse physiological and psychological outcomes (Carver & Scheier, 1994; Ornish 1983; Seligman 1998; Suls & Fletcher, 1985) such as impaired glucose tolerance (Sapolsky, 2001) and distraction from task relevant cues (Williams & Andersen, 1998). For example, emotional preoccupation as a strategy to deal with a stressor was marginally associated with new brain lesions in a sample of multiple sclerosis patients (Mohr, et al., 2002). Another example is that an avoidance dispositional coping strategy such as use of alcohol can produce deterioration in the form of cirrhosis of the liver. The dispositional use of denial, another avoidance strategy, will not change the existence or severity of a stressor but rather prolong it (Anshel, 2000, Carver & Scheier, 1994).

Adaptive Versus Maladaptive Coping

Several authors emphasize that certain responses to stress may tend to be maladaptive (Carver, et al., 1989) and result in unfavorable outcomes, such as state anxiety (Ryksa, 1993a; Zeidner & Hammer, 1992) or symptoms of nervous tension (Beard, 1980). There have been attempts to categorize coping strategies as beneficial or not.

Freud (1938) was the first to catalogue a listing of defensive mechanisms used by individuals to discharge stress produced by the conflict between the id and ego (Moshe, 1997). These are displacement, sublimation, projection, reaction formation, repression, rationalization, and regression (Freud, 1938). As a result, investigators have attempted to differentiate coping into lower level and higher level strategies. Lower level defensive behaviors are rigid, unconscious, persistent from the past, disjointed, and permit impulse

gratification through subterfuge coping. Higher level coping is described as flexible, conscious, purposeful, future-oriented, reality-focused, and permits ordered and open-minded gratification (Moshe, 1997). Approach coping strategies such as information seeking, seeking social support, and problem-solving would fall under the category of higher level coping and therefore appear to be more of a positive means of coping than avoidance behaviors such as blame and denial (Lehman & Glanz, 1997). Specifically focusing on and venting of emotions may sometimes be functional in the short-term; however, focusing on these emotions for long periods can impede adjustments and divert energies from more active means of coping efforts that could better decrease or change the stressor (Seligman, 1998).

Lazarus (2000), states that any separation that pits one type of coping against the other with regard to effectiveness can be misleading. Thus, it may not be possible to identify "positive" or "negative" coping styles, per se. However, investigations point to the negative impact of certain coping strategies regardless of circumstances. There is a general consensus from a health perspective that use of alcohol and drugs as well as other risk taking behaviors as means to cope are deemed harmful in all situations, whether changeable or not (Moshe, 1997). Adaptive coping should ideally lead to permanent problem resolution with no additional conflict or residual outcomes while maintaining a positive emotional state. For example, Mohr et al. (2002) demonstrated modest support for the hypothesis that active or approach coping can moderate the relationship between stress and the development of new brain lesions in multiple sclerosis patients. Despite this evidence, the division of coping strategies into approach and avoidance is likely an oversimplification of a complex process (Folkman & Lazarus, 1985). However, this

division promotes investigation of outcomes and does not eliminate the ability to delineate these two categories of behavior into more specific subscale measurements of coping behaviors.

Dispositional Coping Styles

Coping disposition has been described by Lazarus & Folkman (1984) as a stable characteristic similar to the construct of personality. The actual strategies that a person will use can be situation specific and environment specific (Folkman, Lazarus, Dunkel-Schetter, DeLongis, Gruen 1986). When discussing the impact individual differences has upon coping styles, one could entertain the possibility that an individual uses a different style of coping when confronted with a different stressful situation, as initially described by Lazarus and Folkman (1984). That is, one person might preferentially use approach coping versus avoidance coping after missing a free throw but use avoidance coping when confronted by criticism from a coach.

Anshel (2004) asserts that dispositional coping is not necessarily a stable construct and can be affected by situation, appraisal, and learning. This would support continual assertions from these and other investigators that coping is an active process that shifts in nature within a stressful event (Carver & Scheier, 1994; Folkman & Lazarus, 1985; Lazarus, 2000; Ryska, 1993a). Therefore, as described by Compas (1987), coping can be conceptualized at two levels, specifically, coping can be assumed consistent across various stressful situations, or coping can be assumed to be consistent under similar situations but can vary as features of the environment or as cognitive appraisals of the environment change.

According to M. H. Anshel, (personal communication, August, 2004) dispositions are, by definition, not easily changed. However, although they are relatively entrenched, they are not personality traits. Thus, the "environmental stimulus will trigger their customary response to that stimulus, which is therefore, situationally controlled" (Anshel, 2004b, p.).

Carver and Scheier (1994) completed a study to investigate dispositional coping styles as predictors of situation coping and appraisal emotions across a specific stressful transaction. In this study, 127 undergraduates completed a measure of dispositional coping. They then completed self-report scales of stress at three points during a stressful event, namely, their first psychology exam. Findings regarding this aspect of the study demonstrated that dispositional coping predicted comparable situational coping at low to moderate levels. For example, individuals with an approach coping style used strategies such as planning, active coping, and use of instrumental support two days prior to the exam and after the exam. The two dispositional scales of turning to religion and use of alcohol correlated strongly with situational strategies throughout the three phases of measurement. Although some authors hold that coping style has no impact upon situational tendencies, 32 of the 39 correlations between coping style and coping strategies within this study were significant.

The correlations found in this study, though not strong, serve to support the TA model and the direct effects of coping styles and coping strategies upon the emotional and physical outcomes of a stressor. For example, participants that reported typically using alcohol to cope with stress reported higher measures of harm emotions throughout this study. Participants measured to typically use over denial (avoidance coping style) to

deal with stress consistently reported more threat throughout the stressful event than subjects that did not possess this avoidance style of coping.

In a subsequent study, Anshel (1996) investigated the consistency between coping styles and the use of coping strategies in response to acute stressors among 421 adolescent male athletes, (14.7 to 17.8 years, M =16, SD = 1.86). Participants were asked to report their reactions following an event that caused them "considerable stress" during sports competition or practice. A 128-item survey was developed and validated within this investigation. Eighty-nine percent of the variance for the complete 128-item inventory was explained by individual differences as a measure of predictive validity. Data were analyzed via structural equation modeling with acceptable goodness of fit (GFI = .87), demonstrating that coping style is a component of an athlete's response to acute stress.

Folkman and Lazarus (1980) assert that traditional personality dispositions are not likely to be useful as predictors of coping; however, as illustrated in the above investigations, this does not indicate that individual differences are unimportant in determining what activity an individual will use within any stage of the stressful encounter (Carver, et al., 1989). Rather, this could support the view that coping styles will vary with the situation. The fact that trait measures have proven to be poor predictors in the past may only be indicative of the failure in the assessment of specific differences and not about the role of the individual differences in general (Carver, et al., 1989). Thus, it is important to differentiate between and measure coping efforts which vary with the situation and coping styles, which are dispositional and thought to be more stable (Anshel, 2004).

Measurement of Coping

The process of approach coping could include seeking assistance, taking direct action, and planning. Distinctions such as these necessitate a sensitive, valid, reliable instrument to facilitate measurement. Folkman and Lazarus (1980) developed the Ways of Coping scale. This consists of a series of predicates which portray a thought or action that individuals may use when under stress. This instrument facilitates the delineation of coping into problem-focused (active) or emotion-focused (avoidance) coping. As a response to this instrument, Carver, et al. (1989) validated the COPE scale in an attempt to base the measurement of coping upon a theoretical basis and also to identify several factors into which means of coping could be more systematically grouped. Specifically, there are three subscales: active coping, seeking social support, and avoidance coping, which are then further sub-divided.

Active coping is defined as the process of taking active steps to remove the stressor or decrease its cause for concern. This category of actions occurs in the actual coping phase and includes increasing one's efforts, initiating direct action, and implementation of coping in a planned progressive manner. Therefore, active coping as defined by Carver et al., (1989) is synonymous to problem-focused coping; however, the instrument delineates this category into planning and suppression of competing activities.

Within the COPE scale, planning necessitates devising action strategies about how to cope with a stressor, which is different from executing a problem-focused action. Planning occurs during the secondary appraisal of the stressful event. Another aspect of

active coping is suppression of competing activities, which includes putting other projects aside, or neglecting other activities and avoiding distractions in order to deal with the current stressor.

Seeking social support is the second subscale of the COPE. This has been categorized as problem-focused or approach coping for instrumental reasons, such as seeking information, advice, or assistance. Conversely, seeking social support for emotional reasons would occur if the person were seeking sympathy, understanding, or moral support. This scale scores the techniques used with approach and avoidance coping for example, to differentiate instrumental support versus emotional support.

The third subscale, behavioral disengagement, resembles the description of helplessness and is defined as reducing one's efforts to deal with a stressor. Mental disengagement distracts the person from thinking about the goal with which the stressor is interfering (e.g. watching television or daydreaming). Denial is the refusal to believe that the stressor exists or trying to act as if the stressor is not real. Acceptance is a functional coping response and is the extent to which the person acknowledges the reality of the stressful situation. Finally, turning to religion is also measured as a coping response and can be categorized as an active coping (problem-focused) response. Within this instrument, it is defined as a general tendency to turn to religion when under stress.

It can be seen that the COPE scale attempts to differentiate coping by more specifically defining the actions that an individual adopts during the stressful encounter. In an attempt to simplify the measurement of coping strategies, Carver (1997) devised the Brief COPE scale. The Brief COPE Inventory (Carver, 1997) is a 28-item instrument and is an abbreviated version of the COPE Inventory (Carver, et al, 1989). It consists of 14

scales of two items each and was constructed to eliminate the redundancy and cumbersome nature of the full COPE Inventory (Carver, 1997). It measures a broad range of coping reactions that individuals typically use in stressful life events. These can be categorized as approach-coping or avoidance-coping. (C.S. Carver, personal communication, 2004). The problem-focused (approach) coping subscales as defined by Carver (1997) in the Brief COPE Scale include active coping and planning. The remaining subscales were then classified as emotion-focused (avoidance) coping to include positive reframing, acceptance, humor, religion, using emotional support, using instrumental support, distraction, denial, venting, substance use, behavioral disengagement, and self-blame.

This scale also attempts to address the concerns regarding the role of individual differences within the stress and coping processes. This scale allows for the measurement of dispositional coping style with an adjustment of the stem for each item from concurrent to dispositional. For the purposes of this investigation, coping efforts and dispositional coping styles will be measured separately in an attempt to assess if a difference exists between these variables within this population. This has been a limitation in the study of stress and coping, whereby the distinction between coping efforts and coping styles has not been made, and one or the other has been measured but not both consistently. The measurement of both constructs within this investigation will promote the determination of their relative contributions, if any, to the outcome of competitive state anxiety in a performance situation.

Variations in Classification of Coping Strategies

It has been argued by some investigators that the classification of coping strategies into the 2 categories of active and avoidance coping is simplistic and can obscure the relevant differentiation of the functionality of different coping strategies. Various investigators, as illustrated in Table 1, have attempted to bring structure to the study of coping by providing broad categories into which coping can be assigned with variability in nomenclature. (Detail of the categorization of specific items within the Brief COPE Scale is provided in Appendix D).

Table 1. *Classifications of Coping Strategies*

Authors	Categories	Elements
Pearlin & Schooler (1978)	Problem focused and emotion focused and managing meaning	Es for meaning-making: positive comparison or selective ignoring.
Billings & Moos (1981)	3-factors: Active Cognitive, Active Behavioral, Avoidance	AC& AB are both problem-focused coping: AC: e.g., tried to see the positive side; considered several alternatives. AB: talked with a friend, tried to find out more about the situation. Avoidance is a form of emotion-focused coping: e.g., tried to reduce tension by eating more, got busy with other things to avoid thinking about the problem.
Folkman & Lazarus (1980)	2 main categories: Problem-focused & emotion-focused	PF: addressing the problem causing the distress. E.g., making a plan of action or concentrating on the next step. EF: aimed at ameliorating the negative emotions assoc with the problem. E.g., Positive reappraisal (L&F 1984), engaging in distraction activities, using alcohol or drugs, or seeking emotional support.
Roth & Cohen (1986)	Approach and avoidance	Approach defined as cognitive and emotional activity directed toward the threat with avoidance defined as cognitive and emotional activity directed away from the threat.
Amirkhan (1990)	Problem solving, seeking support	Added seeking social support.

Table 1, cont.

	and avoidance	
Park & Folkman (1997)	Problem-focused, emotion-focused and added meaning-making	Person draws on values, beliefs and goals to modify the meaning of a stressful transaction, especially in cases of chronic stress that may not be responsive to problem-focused efforts

Authors	Categories	Elements
Zautra et al (1996)	4 factor structure: problem-focused , emotion-focused, social coping and meaning-focused coping	Active(active restraint and planning), avoidance (denial, drugs, mental disengagement) social (seeking instrumental support, seeking emotional support) and positive cognitive restructuring (positive reinterpretation, humor, acceptance)
Parkenham (2002)	Problem-focused and interpersonally supportive versus avoidant and critical	Measure of multiple sclerosis caregiving revealed 5 factors: supportive engagement, criticism and coercion, practical assistance, avoidance and positive reframing. Second order principal components factor analysis revealed that supportive engagement, positive reframing and practical assistance coping loaded on one factor identified as predominantly problem-focused and interpersonally supportive, while avoidance and criticism and coercion loaded on a second factor named avoidant and critical.
Miller and McCool (2003)	Substitution behavior, direct action and rationalization	Individuals can change their behavior (substitution), attempt to change their environment (direct action), or change the way they evaluate the situation (rationalization)
Kershaw, Northouse, Kritpracha, Shafenacker, Mood (2004)	Active coping versus avoidant and maladaptive coping	Active coping defined by these authors as strategies where individuals accept and actively attempt to deal with their situation to include planning, seeking emotional support and problem-solving. Avoidant coping refers to strategies where individual try to avoid dealing with problems by distancing (either cognitive or physical) to include strategies such as denial, behavioral disengagement and alcohol/drug abuse

Table 1, cont.

Carver, Scheier, & Weintraub (1989)	Problem-focused (PF) versus emotion focuses (EF) versus dysfunctional	Problem focused a priori assignment of subscales included active coping, planning, suppression of competing activities, restraint coping and seeking social support for instrumental reasons. Seeking social support for emotional reasons was described as EF. Discussed that turning to religion, denial and acceptance could be either PF or EF. Positive reinterpretation and growth discussed as a type of EF aimed at managing distress emotions. Finally, behavioral disengagement, mental disengagement were discussed as dys-functional. (see below for further discussion)

Social support is discussed with detail later in this review, however, it is important to note that this construct contributes to the variability in the categorization of coping strategies. It can be said that there are three main functional aspects of social support (Thoits, 1985), namely, emotional (to include intimacy, concern and attachment), instrumental (provision of assistance) and informational (provision of information or guidance specific to the situation). Therefore, "talking to a friend" as a means of coping could be instrumental support (approach), informational (approach) or emotional support (avoidance) which can represent different categories of coping.

Because a variation of the Coping Orientations to Problems Experienced Scale (COPE Scale) devised by Carver, Scheier and Weintraub (1989) was used in this investigation, namely the Brief COPE scale, a discussion of the structure of the original instrument with similar results obtained with the subsequent instrument is relevant. A priori assignment of items within this scale were divided into 13 subscales, namely, active coping, planning, suppression of competing activities, restraint coping, seeking social support for instrumental reasons, seeking social support for emotional reasons, positive reinterpretation and growth, acceptance, turning to religion, focus on and venting

of emotions, denial, behavioral disengagement, mental disengagement and finally, alcohol-drug disengagement. Though these authors discuss the categorization of these subscales as demonstrated in Table 1 above, the distinctions were not clearly made for all subscales.

The exploratory factor analysis revealed that active coping items and planning items loaded on one factor. Suppression of competing activities items and restraint coping items loaded on a second factor. Items related to seeking social support for both emotional and instrumental reasons loaded on one factor. The alcohol-drug disengagement item did not load on any factor. The second order factor analysis resulted in four factors each containing three scales. Active coping, planning and suppression of competing activities loaded on one factor. Another factor included seeking social support (both instrumental and emotional) and focus and venting of emotions. A third factor included denial as well as mental and behavioral disengagement. Finally, the fourth factor incorporated acceptance, restraint coping and positive reinterpretation and growth. It should be noted that these four factors are not all distinctly approach or avoidant coping. Turning to religion did not load on any of these factors. These findings demonstrate that the second-order factor analysis did not replicate the hypothesized structure of problem-focused versus emotion-focused coping (Schwarzer & Schwarzer, 1996). Further, findings demonstrate that the categorization of coping strategies is can be complex and dependent upon other factors that may not be captured by current instrumentation. Carver and colleagues (1989) emphasize that their theoretically based scale merits further investigation with other samples. It is based upon theory and therefore is a more rational approach to the measurement of coping than other existing methods.

Table 1 demonstrates that items within the Brief COPE can be categorized by various means and still remain consistent with the TA model for stress and coping. For the purposes of this investigation, problem-focused (approach coping) and emotion-focused (avoidance coping) as defined by Lazarus & Folkman (1980) was used. Within this investigation, exploratory factor analysis was performed with items allowed to load upon factors as possible. Per recommendations by Carver, and due to limited psychometrics for the Brief COPE beyond the initial validations, the scale was to be assessed for validity within this sample of athletes. (see Appendices D & E for factor solution tables)

Coping Outcomes

Coping outcomes are an individual's adaptation to stressors that have been influenced by coping efforts and follow the initial appraisal of the situation (primary appraisal or threat) and appraisal of their resources to meet the situation (secondary appraisal or controllability/ability to cope). Adaptation is the term used by Lazarus and Folkman (1984) composed of the processes employed to manage the environmental demands. Adaptation can, therefore, be described as the series of responses that yield outcomes. Outcomes can be positive or negative as a result of effective or ineffective coping.

The main categories of outcomes are emotional well-being, functional status, perceived cognitive functioning (Moshe & Saklofske, 1996; Ryska, 1993a), and health behaviors (Glanz, et al., 1997). These categories of outcome may interact with each other such that emotional reactions can affect health status through the processes of the

endocrine, immune, or nervous systems (Sapolsky, 2000; Taylor et al., 2000). Specific examples of measured outcomes include presence or absence of positive affect, presence or absence of injury, and perceived adaptive or maladaptive coping. Another specific example of a negative outcome is state anxiety. Within this investigation, the degree of state anxiety will be used as a measure of functional outcome with regard to coping in an acute stress situation. Thus far, the variables within the TA model have been defined; however, there remains one more concept within this stress process that affects the relationship between stress, coping and outcomes, namely social support.

Social Support

Social support has been conceptualized as a system of "enduring interpersonal ties to others who can be relied upon to provide emotional sustenance and resource in times of need as well as provide feedback according to shared standards and values" (Ryska, 1993, p. 274). Dolbier and Steinhardt (2000) classified the different aspects of social support as quantity versus quality, globality versus specificity, and received support versus perceived support. These authors emphasize the importance of distinguishing how social support is to be measured, due to the fact that there are strong implications for how each form of social support influences health and other outcomes.

Social support has been operationally measured in different ways; such as, a focus on the quantitative aspect, which emphasizes the number of friendships, as opposed to qualitative measures, which focus upon feelings of interconnectedness and subjective appraisals of the adequacy of support networks (Cohen & Hoberman, 1983; Cutrona & Russell, 1987). Billings and Moos (1981) illustrate that, among women within their

study, the quality of the social resources was more strongly related to the mood and symptom criteria than was the quantity of the social resources available, thus emphasizing that there is relevance to the qualitative measurement of social support as well as the quantitative aspect.

Social support in competitive sport has had limited investigation (Ryska, 1993). However, some of the health outcomes associated with social support include decreased susceptibility to disease, enhanced immune function, and increased psychological well-being (Cutrona & Russell, 1987; Lambert 1990). The majority of the remaining research centers on injured athletes. For example, social support networks have been shown to relate to decreased levels of life stress and decreased incidence of athletic injury (Hardy & Riehl, 1990; Manuel, et al., 2002; Passer & Seese, 1983; Smith, et al., 1990; Williams & Andersen, 1988). In a study by Bianco (2001), social support was associated with a decrease in distress and maintenance of motivation among a group of injured elite downhill skiers recovering form sport injuries. Social support has also been associated with lower initial depressive symptoms in a group of adolescent injured athletes (Manuel, et al., 2002). These finding demonstrate positive aspects and contributions of social support for an athlete that can come from the coach, family, friends, and health care provider. Findings such as those described previously and emphasized by other authors (Ornish, 1984; Sapolsky 2001; Seligman, 1998) advocate the importance of social support to moderate the stress-coping relationship. Therefore, the measurement of social support within this dissertation of elite athletes will be the perception of social support in the context of a global dimension, as opposed to the quantity or provisions of the social support provided (Dolbier & Steinhardt, 2000).

Summary

The description of the constructs of the TA model provided thus far illustrate the inter-relatedness of the variables within the stress and coping process, with the simplified version of this process depicted in Figure 3. This model presents a basic structure for the investigation of the coping process within an understudied population of elite athletes in a high performance situation.

In summary, situational stress impacts primary appraisal as an individual assesses the potential threat or challenge of the stressor. In addition, situational stress can directly affect secondary appraisal with an assessment of available coping resources. Primary appraisal and secondary appraisal directly impact coping efforts, as do dispositional coping style and social support. Finally, based upon theory of the TA model, dispositional coping and social support also directly affect the outcome variables such as emotional well-being and functional status.

The proposed mediational model (see Figure 4) to be assessed with structural equation modeling in this investigation appears more complex and is an attempt to investigate the relationships within the stress-appraisal-coping process. Within this proposed model, the proximal measurable outcome of the stress process is that of competitive state anxiety. The direct effects of the construct "tennis ability" will be investigated. It is hypothesized that this construct, which consists of current rank, will have a direct effect upon competitive state anxiety, and due to its component of prior experience could also affect primary and secondary appraisal. An athlete's experience and familiarity with the environment may decrease somatic and cognitive state anxiety symptoms within this high stakes event (Hanson, McCullagh, & Tonymon, 1992).

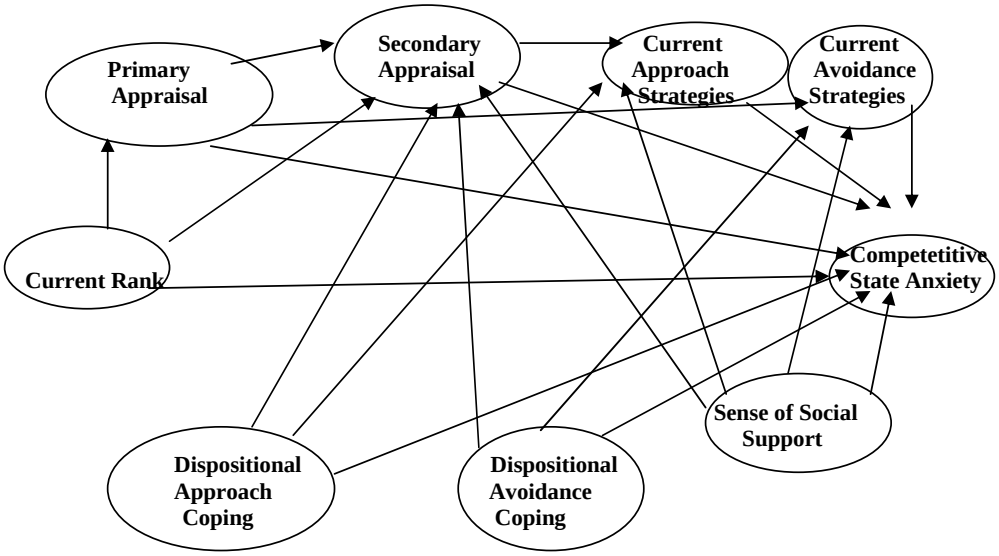


Figure 4. Proposed structural model of stress and coping for investigation.

The proposed structural equation model (without error terms) illustrates the relationships between social support, coping styles and coping strategies in addition to the individual factor of current rank upon the outcome of competitive state anxiety.

Dispositional coping style will be partitioned into dispositional avoidance coping and dispositional approach coping to assess the direct effects upon avoidance and approach coping strategies, as well as upon competitive state anxiety, both directly and indirectly. Similar to results obtained by other investigators, coping styles within this sample may be distinct and affect coping strategies independently (Anshel, 2000a; Anshel & Anderson, 2002; Rutherford & Endler, 1999).

Because social support can be considered a resource for coping, its direct effect upon secondary appraisal has been included as a path within the proposed model. Social resources have been demonstrated to increase approach coping with improved

psychological functioning predicted by initial resources (Holohan & Moos, 1990). Therefore, the impact of perceived social support upon coping strategies and competitive state anxiety is also been placed within the proposed model. Due to the lack of available empirical data for this population, the proposed model, though based upon theory, is exploratory in nature.

Identification of a Problem

The Women's Tennis Association Tour (WTA Tour) is the governing body of the professional women's tennis circuit, and in 1994, it undertook an investigation to ascertain the adequate, safe dosage of tennis for young professional women tennis players. Also included in this needs assessment was a search to identify the stressors associated with life on the professional tennis circuit. The WTA Tour empanelled experts in the areas of sports medicine, sports psychology, human and adolescent development, and women's health to ascertain a solution to prevent psychological and physical overtraining for the athletes on the WTA Tour. This panel of experts generated the Age Eligibility Commission (AEC) report (1995) based upon testimony from over 100 witnesses associated with the women's professional tennis tour. This pool of individuals included former players, current players, agents, parents, primary health care providers, tournament physicians, administrators, tournament supervisors, and referees, among others, who provided personal testimony regarding their observations and experiences of stress on the professional circuit. The findings of the report included the fact that, as with all sport, the world of tennis has many stressors. For the female athlete on the WTA Tour, the primary stressors of media, family, competition, travel, and night matches were identified and determined to be most concentrated during a Grand Slam event. To address

these stressors throughout the year, the WTA Tour created various programs. The health risks associated with unmanaged stress have been recognized by the WTA Tour with interventions put in place to provide assistance to this group of athletes. This population during a high stakes event provides a useful opportunity to apply the TA model as a theoretic basis of a stressful event, with the level of competitive state anxiety as a natural outcome.

CHAPTER 3: METHODOLOGY

Introduction

This dissertation uses self-report data to assess the predictors of state anxiety in professional female tennis players. Measurements are based on the transactional model of stress and coping (TA model) within a population of elite female tennis athletes (N = 94). This is a cross-sectional, quasi-experimental study. Descriptive statistics are reported; however, structural equation modeling (SEM) is used to test the relationships amongst constructs of the TA model. The full TA model with its latent variables and indicators for these variables presents a complex structure to evaluate in total. A conceptual model was constructed and examined to determine the best fit based upon the data. This also tests the ability of constructs to explain the variance in the level of anxiety as an outcome of the stress and coping process, and thus the final model can potentially explain the relationships within the stress and coping process among this elite group of athletes. Due to the lack of data available with this population, this investigation is exploratory in nature. Although a limitation, given the paucity of research in this population, these data will provide a significant step forward in our understanding of stress, coping and competitive state anxiety in the professional female tennis player.

Participants

The participants in this investigation are 94 female professional tennis players aged 18-47 years, competing in a Grand Slam event on the WTA Tour (n = 84) occurring in New York City and in a Tier II (n = 10) hardcourt event in the United States. All participants understand the English language and potential subjects were excluded if

unable to comprehend English. A Grand Slam is considered a "high stakes" event based upon the many points to be gained or lost, the prize money offered, and the extensive media coverage. Therefore, this can be a high stress tournament on the WTA Tour. The second data-acquisition venue, a Tier II tennis event, captured a lower ranked group of athletes for whom this event also represents high stakes. A Tier II event is considered a high stakes event for lower ranked players due to the ranking points available. If athletes are successful, the Tier II event provides the opportunity to compete in higher-tier WTA Tour events. Both of these events have significant impact on yearly earnings and ranking to qualify for entry into other WTA Tour events. Thus, they have provided a unique opportunity to examine elite athletes in a potentially stressful competitive environment. Further, both events provide sufficient stress for a fair test of the TA model within the sample recruited during these events (N = 94).

All players in the qualifying draw at the Tier II event and those at the Grand Slam event were asked to participate. This resulted in a sample size of 94 out of a combined total of 150 athletes. Participants' ranking ranged from top 10 in the world to 285, with athletes from countries such as Spain, Italy, France, Japan, Argentina, and the United States. Recruitment from both of these events promoted a more even distribution of participants and therefore, the sample is representative of all professional female tennis players during competition.

Participants completed a consent form (see Appendix A) that explained the general purpose of the study. They were informed that they could withdraw from the study at any time without penalty or any hardship to their future participation on the WTA Tour. They were also informed that the survey would take between 20 and 30

minutes, that it should be completed on site, and that their responses would be kept confidential. No financial incentive was offered for participation. This methodology was approved by the University of Texas at Austin Institutional Review Board and the University of Texas Health Science Center at San Antonio Institutional Review Board.

Recruitment

Participants were recruited while on site at the Grand Slam tennis tournament in New York City and at a Tier II event in North America. Flyers were placed in the locker room areas, and an announcement was made during a mandatory staff meeting. The Tier II tournament location was chosen due to its similarity to a Grand Slam event with regard to media attention, prize money, and point value for players of a lower ranking.

Instrumentation

The 98-item instrument used for data collection was called the Competition Questionnaire and is composed of five questionnaires, namely: (a) Revised Competitive State Anxiety Inventory-2 (R-CSAI-2; Martens, 2003); (b) two forms of the Brief Coping Orientations to Problems Experienced Scale (Brief COPE; Carver, 1997); (c) Sense of Support Scale (SSS; Dolbier & Steinhardt, 2000); and (d) Primary and Secondary Appraisal Likert Scale (Blascovich & Tomaka, 1993). The entire Competition Questionnaire is available in Appendix B.

Revised Competitive State Anxiety-2R

Competitive state anxiety was assessed through the Revised Competitive State Anxiety Inventory-2R (CSAI-2R; Martens, 2003). Based upon the Competitive State

Anxiety Inventory-2, (Martens, Burton, Vealey, Bump, & Smith, 1990), the CSAI-2R is a 17-item test with stronger psychometric properties in terms of its factor structure than the original instrument, CSAI-2 (Martens, 2003). This 17-item instrument measures three related though independent competitive states: cognitive state anxiety (worry), somatic state anxiety, and confidence. The two subscales of cognitive and somatic anxiety were used for a total of 12 items to measure state anxiety. This self-report instrument allows an athlete to report her current feelings about a competition situation by providing answers along a 4-point response scale anchored with 0 (*not at all*) to 3 (*very much so*). Sample items include: "I feel tense in my stomach" (somatic item), and "I am concerned about losing" (cognitive item).

The two subscales of cognitive and somatic anxiety were used in this study, and scores were obtained by summing the cognitive anxiety items, dividing by number of items (5) and multiplying by 10, per instructions by the author (Cox, Martens & Russell, 2003). Likewise, somatic item scores were added, divided by the number of items (7), and multiplied by 10.

Reliability coefficients for the CSAI-2 subscales range from .70 to .90 (Martens et al., 1990), with total scores on each subscale ranging from a low of 9 to a high of 36. This scale, form E, which replaced the word *worry* with the word *concern* due to social desirability contamination, has demonstrated a high degree of internal consistency for a sample data of intercollegiate athletes (Martens et al., 1990). Cronbach alpha reliability coefficients (across three samples of athletes) ranged form .79 to .83 for the cognitive-A state scale, from .82 to .83 for the somatic A-state scale and from .87 to .90 for the state self-confidence scale. Concurrent validity has been demonstrated by the responses from

three independent samples of athletes correlated with their responses to the Sport Competition Anxiety Test, general state and trait anxiety scales, and the Zuckermann Affect Adjective checklist as well as the Alpert and Haber's Achievement Anxiety Test (Martens et al., 1990).

Correlations among the CSAI-2 subcomponents were calculated to test the hypothesis that the CSAI-2 subcomponents are moderately related to one another and that state anxiety is not a one-dimensional construct (Caruso, Dzewaltowski, Gill, & McElroy, 1990). Results supported this hypothesis, whereby cognitive worry and somatic anxiety yielded $r = .58$ at mid-competition during a failure situation ($p < .01$) and $r = .69$ during a success situation, as well as a result of cognitive worry and self-confidence, $r = -.50$ ($p < .01$). These results support the multidimensional nature of competitive state anxiety and also support findings by other investigators (Gould et al., 1984; Martens et al., 1983; Ryska, 1993b). A MANOVA on the three CSAI-2 subscales scores was conducted to examine the changes over time and the three conditions within this study of failure, success, and non-competition. There was a significant time effect and a significant condition effect, which supports the premise that the CSAI-2 is sufficiently sensitive to reflect changes in state anxiety over time and between conditions.

The CSAI-2R is a modification of the original CSAI-2 in that it consists of fewer items and has been validated with the use of confirmatory factor analysis (Cox, Martens, & Russell, 2003). An investigation of 503 college-age intramural athletes and a second validation sample of 331 intercollegiate (Division 1) and interscholastic athletes, resulted in a good fit of the data to the model (CFI = .95, RMSEA = .05). The validation of this

more parsimonious scale merits its use when measuring competitive state anxiety among athletes.

Dispositional Coping Style and Coping Strategies

The Brief COPE Inventory (Carver, 1997) is a 28-item instrument and is an abbreviated version of the COPE Inventory (Carver, et al, 1989). It consists of 14 scales of two items each and was constructed to eliminate the redundancy and cumbersome nature of the full COPE Inventory (Carver, 1997). It measures a broad range of coping reactions that individuals typically use in stressful life events. These can be categorized as approach-coping or avoidance-coping based upon face value of the items (Carver, personal communication, 2004). However, in the original construction of the Brief COPE instrument, the items within active coping and planning loaded on one single factor (Carver, Scheier, & Weintraub, 1989). As discussed in prior chapter, remaining subscales, namely, positive reframing, acceptance, humor, religion, using emotional support, using instrumental support, distraction, denial, venting, substance use, behavioral disengagement, and self-blame can be grouped in variable ways as avoidant, approach or maladaptive. Questions are presented in a 3-point response scale format anchored with *don't do at all* and *do a great deal*.

By changing verb forms, the response option formats may be (a) situational and retrospective, (a) situational concurrent, or (c) dispositional, to reflect past strategies, current coping strategies, or dispositional coping style. In this investigation, the dispositional format was used to assess coping style. Therefore, an example of an item in a dispositional format is "I do things to try to take my mind off of the situation," and a situational concurrent item is "I'm doing things to try to take my mind off the situation."

Response options to be used for the dispositional coping style format range from a value of 0 (*I usually don't do this at all)* to 2 (*I usually do this a great deal*). Dispositional coping style was calculated by summing the approach-coping items contained in the two subscales, and avoidance-coping style was measured with the items in the remaining subscales using the dispositional format.

For coping strategies, a situational concurrent item is "I am doing things to take my mind off the situation." Once again, a 3-point response scale is provided, anchored with *I am not doing this at all* and *I am doing this a great deal*. Current coping strategies were calculated in the same manner as dispositional coping. Data obtained by Carver (1997) yielded internal reliability for the Brief Cope above .50 with all scales, except for the scales of venting, denial, and acceptance exceeding an alpha reliability of .60. Carver et al. (1989) demonstrated weak correlations between dispositional coping and current coping scales (ranging from $r = .07$ to $r = .34$) except for religion ($r = .76$) and substance use ($r = .50$). However, this dispositional coping scale was included within this investigation to assess the relevance of this measurement within this population.

Sense of Support Measurement

Sense of social support, as defined by Dolbier and Steinhardt (2000), is an individual's undifferentiated perception of the quantity and quality of social support. The instrument used to assess an individual's perception of the availability of social support is called the Sense of Support Scale (SSS), and the items form a composite index of this sense of support as opposed to specific subscales of the function of the social network. This instrument consists of 21 items, and individuals were instructed to circle the

number that best describes what is generally true for them on a 4-point response scale ranging from 0 (*not true at all*) to 3 (*completely true*). Possible scores range from 0 to 63.

This scale measures quantity of social support by items that measure the diversity of social relationships with various social ties, such as family, friends, club memberships, and coworkers. Quality of social support is measured by the function of the social relationships as well as an individual's perception of reciprocity. Sample items are "I look for opportunities to help and support others" and "I have friendships that are mutually fulfilling." Data used in the final version to validate and develop the SSS (Dolbier & Steinhardt, 2000) had an internal consistency of .86 and a test-retest reliability of $r = .91$, $p < .001$. Convergent validity was demonstrated by significant relationships to hardiness ($r = .37$, $p < .01$) and approach-coping ($r = .37$, $p < .01$) with divergent validity supported by obtained inverse relationships to perceived stress ($r = -.37$, $p < .01$) and symptoms of illness ($r = -.25$, $p < .01$). Finally, the data obtained by Dolbier and Steinhardt (2000) supported concurrent validity for this scale by yielding significant relationships to the Interpersonal Support Evaluation List ($r = .78$) and the Social Provisions Scale ($r = .72$).

Primary and Secondary Appraisal

The stress appraisal index proposed by Tomaka and Blascovich, (1993) is based upon the answers to two questions. First, primary appraisal was assessed by asking subjects to respond to the following question: "How much of a threat (pressure) do you feel the upcoming match presents to you?" Subjects were asked to respond to a 5-point response scale anchored from 1 (*not at all*) to 5 (*an excessive amount*).

Secondary appraisal was assessed by asking subjects to respond to the question: "How able are you to cope with this threat (pressure)?" anchored from 1 (*not at all able to cope)* to 5 (*not a problem to cope*). Total cognitive appraisal can be represented by the appraisal index, computed as the ratio of primary to secondary appraisal. The quantity yielded reflects the extent to which the situational (environmental) demands are perceived as taxing or exceeding the subject's resources or ability to cope. This appraisal index has been used in prior studies regarding threat and challenge (reviewed in Blascovich & Tomaka, 1996). These primary and secondary appraisal questions are consistent with Lazarus & Folkman's theory of stress and reflect the relative balance between demands and resources (Tomaka & Blaskovich, 1993). These questions and the ratio have been used in prior investigations to measure cognitive appraisal (Blascovich, et al., 1992; Blascovich, Mendes, Tomaka, Salomon, & Seery, 2003; Blascovich, Seery, Mugridge, Norris, & Weisbuch, 2003; Blascovich & Tomaka, 1996; Dolbier & Steinhardt, 2000; Herrald & Tomaka, 2002; Tomaka, Blascovich, Kelsey, & Leitten, 1993; Tomaka, Blascovich, Kibler, & Ernst, 1997). Within this investigation, the two questions were used to differentiate between primary and secondary appraisal.

Procedures

All athletes entered in the tennis competition(s) were asked to participate in this study. Upon completion of the consent form, each athlete was issued a Competition Questionnaire consisting of 98 items. Respondents completed the questionnaire on-site with assistance from the researcher as needed. Each questionnaire was issued a code number to preserve anonymity. Preventive steps were taken to

minimize potential response biasing, as recommended by Ryska (1993b). These steps included the following: (a) participants were informed that their answers would remain confidential and therefore would not be shared with their coaches or families; (b) an innocuous title was given to the instrument, namely, Competition Questionnaire; (c) a prescribed set of anti-social desirability instructions (Martens, 1977) were read to respondents, and participants were reminded that there are no right nor wrong answers. Upon completion of the questionnaire, the participant placed the numbered questionnaire in an unmarked envelope, and the envelope was sealed.

Data Analysis

Structural equation modeling (SEM) was used to assess the goodness of fit of the proposed model using the Amos 5 software package (Arbuckle, 2003). Because the goodness of fit of the model can be analyzed using a number of indices, there is considerable debate regarding which indices are appropriate (Loehlin, 1992). The general practice is to report multiple indices of fit. The comparative fit index (CFI) and the root mean square error of approximation (RMSEA) were used. The CFI is one of a class of relative fit indices. They are compared to an independence model or null model, where all covariances yield a zero value. A CFI value greater than .90 (Bentler & Bonnett, 1980) was considered indicative of acceptable fit, with a value greater than .95 indicative of close fit, thus indicating that the proposed model is at least 95% better than the independent or null model.

The RMSEA is actually a measure of model misfit. The direction of this value is opposite to the direction of the relative fit indices. It is an estimate of how much error

there is per parameter. It illustrates the difference between the covariance matrix implied by the structural model and the one in the acquired data. Given the complexity of the proposed model, the use of the RMSEA is appropriate. The smaller the value of the RMSEA, the better the fit. A RMSEA below .08 was to be considered a reasonable fit of the model with a RMSEA below .05 considered to be a "close fit" (Browne & Cudeck, 1993). The chi-square statistic is commonly used. However, because this can be sensitive to sample characteristics such as sample size and complexity, and therefore has been reported in this dissertation, but not used singly as a goodness of fit index.

Measurement Models

Prior to evaluating the hypothesized model, it is important to first verify the validity structure of the measurement models. According to De Vellis (2003), determining the nature of latent variables underlying an item set is critical. De Vellis also states that the set of items is assumed to be unidimensional. Therefore, a series of analyses was used to test the dimensional structure of the measurement instruments used within this investigation before proceeding toward full model construction.

Steps performed with the model specification process are as follows:

1. Factor loadings for items were obtained in order to identify the relevant indicators of the latent variables of the model. Three indicators are needed in order to define a latent variable, and if a scale used was unidimensional, the items were packaged as 3 random parcels and assessed for loading magnitude. Items with factor loading values less than .30 were automatically dropped due to low loading. Cronbach's α levels for the indicators were also assessed. The goal for the first step of model analysis was to retain a measurement model

with minimal item factor loadings of .3 and minimal Cronbach's α values at the indicator level of .50 deemed acceptable.

2. Once the measurement model was constructed with its theoretical latent variables verified by the associated indicators, the goodness of fit was tested. Acceptable indices of fit used were the same for the measurement model as for the final constructed conceptual model, specifically, a CFI value greater than .90 (Bentler & Bonnett, 1980) was considered indicative of acceptable fit, with a value greater than .95 indicative of close fit. A RMSEA below .08 was to be considered a "reasonable fit" of the model with < .05 a "close fit" (Browne & Cudeck, 1993). The Chi-square statistic was also reported.

3..Measurement models of misfit would indicate an inappropriate or poor measurement instrument for this population, and therefore they were discarded.

4. With the measurement models confirmed, the final conceptual model based upon the relationships within the TA model hypothesized by theory was constructed and then evaluated for goodness of fit.

5 . With the larger conceptual model, the same parameters for goodness of fit were used as with the measurement model. Standardized path scores were also assessed for level of significance ($p < .05$)

Power Analysis

This fully hypothesized model (shown in Figure 5) contains 61 parameters, 19 of which are fixed and 42 of which are freely estimated. Using the SAS macro for power analysis (MacCallum, Browne & Sugawara, 1996), with alpha = .10 and beta = .20,

obtained RMSEA = .08 and the null model RMSEA = .00, a minimum sample size of 88 should provide sufficient power for the model's x^2 test.

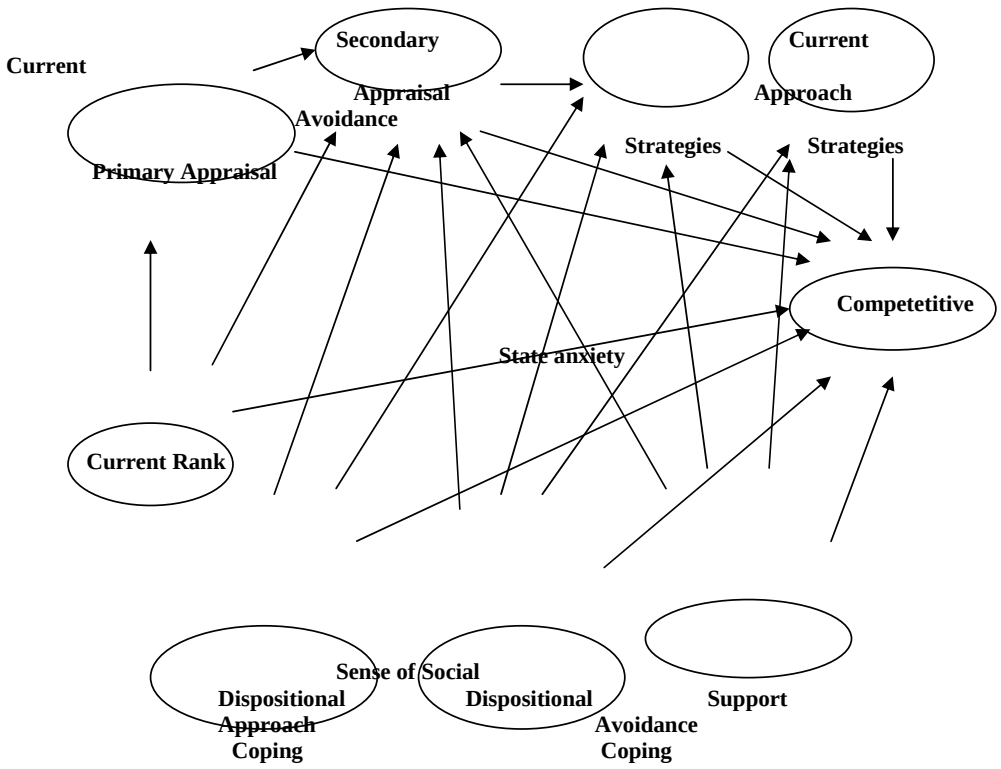


Figure 5. Full hypothesized model

Analysis of Instrumentation

The 98-item instrument used for data collection is called the Competition Questionnaire and is comprised of five questionnaires, namely: (a) the Revised Competitive State Anxiety Inventory-2 (R-CSAI-2; Martens, 2003); (b) two forms of the Brief Coping Orientations to Problems Experienced Scale (Brief COPE; Carver,

1997); (c) the Sense of Support Scale (SSS; Dolbier & Steinhardt, 2000); and the (d) Primary and Secondary Appraisal Likert Scale (Blascovich & Tomaka, 1993). The entire Competition Questionnaire is available in Appendix B.

Use of Measurement Models

The sample within this investigation is unique; a group of professional female tennis players assessed during a high stakes competitive event provides an opportunity to assess stress and coping. However, due to potential characteristics specific to this population, validation of the instruments used is necessary.

Validity evidence will be presented in three sections. First, the assessment of factorial validity for competitive state anxiety will be discussed. Next, the correlations between primary appraisal, secondary appraisal, and competitive state anxiety will be reviewed. Finally, the assessment of factorial validity for the latent variables for the Sense of Support Scale followed by the dispositional and current coping scales of the Brief COPE will be presented.

Competitive State Anxiety Measurement

Due to the predetermined subscales of the Revised Competitive State Anxiety-2 as established by Cox et al., (2003), cognitive state anxiety and somatic state anxiety were assessed with a confirmatory factory analysis (CFA). Oblimin rotation and full information maximum likelihood (FIML) was performed using a covariance matrix. This yielded a 2-factor solution for competitive state anxiety (see Appendix C for factor loading detail). Further assessment yielded a high internal consistency for the cognitive anxiety items (Cronbach's $\alpha = .85$) and somatic anxiety items (Cronbach's $\alpha = .82$). This

demonstrates the reliability of the 2 scales for competitive state anxiety as a two-indicator construct with this data set. (see Table 2).

Table 2

Overall Sample Means, Standard Deviations and Internal Consistencies for the Revised Competitive State Anxiety Inventory – 2 (CSAI-2R)

Item/Scale	Range	Mean	*SD*
Cognitive Scale (α = .85)	1.0–4.0	2.19	0.92
1. I'm concerned about performing poorly.	1.0–4.0	2.35	0.99
3. I'm concerned that I may not do as well in this tournament as I should.	1.0–4.0	2.16	0.92
5. I'm concerned about losing.	1.0–4.0	2.43	0.98
7. I'm concerned about choking under pressure.	1.0–4.0	1.73	0.88
8. I'm concerned that others will be disappointed with my performance.	1.0–4.0	2.29	1.05
Somatic Scale (α = .82)	1.0–4.0	1.70	0.77
2. I feel jittery.	1.0–4.0	2.02	0.83
4. My body feels tight.	1.0–4.0	1.97	0.80
	1.0–4.0	1.68	0.79

able 2,cont.

6. I feel tense in my stomach.			
9. My heart is racing.	1.0–4.0	1.68	0.74
10. I feel my stomach sinking.	1.0–4.0	1.37	0.72
11. My hands are clammy.	1.0–4.0	1.35	0.68
12. My body feels tense.	1.0–4.0	1.94	0.82

Primary and Secondary Appraisal Measurement

Because there is one indicator for each measure of primary and secondary appraisal, values were assessed using a Pearson correlation with the validated cognitive and somatic anxiety measurements (see Table 3). This was then followed by a multiple regression analysis between the primary appraisal, secondary appraisal, cognitive anxiety and somatic anxiety (see Tables 4 and 5). As can be seen in Table 3, there are significant correlations between the measurement of threat to cognitive anxiety, and control to somatic anxiety. There is also an inverse relationship between control with cognitive and somatic anxiety. These relationships are supported theoretically and provide validation for retaining the single measurement values for primary and secondary appraisal within the final conceptual model.

Table 3
Intercorrelations Between Anxiety Measures and Appraisal Measures (N = 94)

Measure	1.	2.	3.	4.	5.
1. Cognitive Anxiety		.60**	.65**	-.50**	.63**
2. Somatic Anxiety			.47**	-.38**	.42**
3. Appraisal Ratio				-.80**	.90**
4. Control					-.54**
5. Threat					

Note. ** p < .01 (2-tailed).

The correlational analyses were followed by regression analyses, with significant values for the relationships of threat and control with cognitive anxiety, which are presented in Table 4.

Table 4

Summary of Regression Analysis for Primary Appraisal (Threat) and Secondary Appraisal (Control) as Predictors of Competitive State Anxiety (Cognitive Anxiety; N=94)

Variable	*R square*	*b*	*SE b*	*β*
Threat	.31	2.69	0.87	0.42**
Control	.37	-2.33	1.09	-0.29*

Note. * p < .05, ** p < .01.

Table 5 presents the results for the regression analysis of secondary appraisal (control) as a predictor of somatic anxiety.

Table 5

Summary of Regression Analysis for Secondary Appraisal (Control) as a Predictor of Competitive State Anxiety (Somatic Anxiety; N = 94)

Variable	*R square*	*b*	*SE b*	*β*
Control	.12	1.45	0.62	0.32*

Note. * p < .05.

Due to the strong correlation values and therefore the potential stability of the full model, the direct measurement of the latent variables of primary appraisal (threat) and secondary appraisal (control) were retained for application to the proposed conceptual model.

Sense of Support Measurement

The instrument used to assess participant perception of the availability of social support is called the Sense of Support Scale (SSS), and the items form a composite index of this sense of support, as opposed to specific subscales of the function of the social network (Dolbier & Steinhardt, 2000). The exploratory factor analysis revealed a 1-Factor solution for this scale, demonstrating that the SSS represents one dimension

(Cronbach's α = .51). Items with smaller loadings, specifically items 1, 2, 3, 4, 7, 12, 15, 16, 18, 20, and 21, were eliminated, increasing the final alpha level (α = .77). A complete listing of items with factor loadings is presented in Appendix D. The retained items (See Table 6) were placed into three arbitrary parcels to indicate sense of social support. This measurement model (Figure 6) demonstrated goodness of fit with $\chi^2_{(1)} = .56$ ($p = .46$), CFI = 1.00, RMSEA = 0.000, (.90 CI = .00 - .25).

Table 6

EFA Factor Loadings for Retained Items of the Sense of Social Support Measure—Single Factor Solution with Internal Consistencies

	Item	Loading
5.	There is at least one person I feel a strong emotional tie with.	.45

Table 6,cont.

6.	There is no one I can trust to help solve my problems.	.57
8.	If a crisis arose in my life, I would have the support I need from families and / or friends.	.40
9.	I belong to a club, such as related support group, special interest sport.	.53
10.	I have friends from work that I see socially (such as movie, dinner etc).	.60
11.	I have friendships that are mutually fulfilling.	.70
13.	I make an effort to keep in touch with friends.	.45
14.	My friends and family feel comfortable asking me for help.	.52
17.	I have a close friend(s) whom I feel comfortable sharing deeply about myself.	.63
19.	I feel well supported by my friends and / or family.	.40

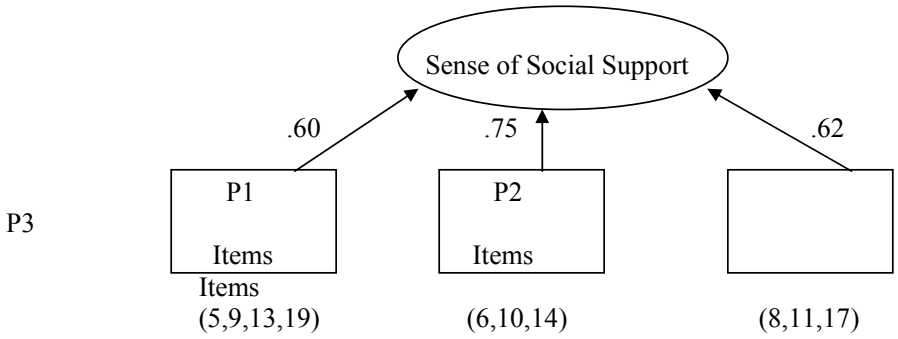


Figure 6. Model for retained items measuring sense of social support.

Dispositional Coping Strategies

The series of steps used to validate the instruments for this unique population, as outlined in the methodology, were to be used with the Brief COPE scale. However, because dispositional and current coping strategies are representative of separate constructs, an initial 2-factor solution with oblimin rotation was performed using FIML as the estimation procedure with all items included. The 2-factor solution for dispositional and current coping strategies with the initial EFA revealed mixed groupings of disposition with current coping strategies. This coincides with the findings obtained by Carver and colleagues (1989) when they initially validated this instrument. These investigators recommended that the dispositional coping scale be assessed with future populations, as was done within this investigation.

An example of items that did not separate into a logical 2-factor solution is the item: "I get comfort and understanding from someone" with the stem "doing right now" (current coping) and "usually do" (dispositional coping), that fell within the same factor, instead of into separate factors of dispositional and current coping. Similarly the approach item "I concentrate my efforts on doing something about the situation I'm in" also grouped within the same factor for the dispositional and coping stems. It could be argued that the approach and avoidance items grouped in pairs within the same factor due to the similarity in the coping strategy irrespective of the time of occurrence (dispositional vs. current); however, the approach item "I take action to try to make the situation better" was split between the two factors and therefore negates this rationale.

Despite the slightly different items used to indicate the current and dispositional strategies subscales, an analysis of their bivariate correlations suggests that the measurement strategy failed to produce separate constructs. Specifically, the *r* values < .66 for each (See Table 7). Given the potential problems with multicollinearity, the theoretical separation between dispositional and current coping was questioned in this group. Due to the lack of theoretical support for the observed split within two factors and the apparent arbitrariness of the division of items, the division between current coping strategies and dispositional coping strategies was not supported, and dispositional coping was dropped from further analysis. (This was also a recommendation made by dissertation committee members after the above preliminary findings were presented).

Table 7

Correlations Between Current Avoidance and Dispositional Avoidance Measures (N = 94)

Measure	1.	2.	3.	4.
1. Dispositional Avoidance Distraction		.68**	.30**	.13
2. Current Avoidance Distraction			.30**	.21*
3. Dispositional Avoidance Self-Blame				.67**
4. Current Avoidance Self-Blame				

Note. * $p < .05$, ** $p < .01$.

Current Coping Strategies

Factorial validity of the 14 subscales (2 items each) of the current coping strategies of the Brief COPE Inventory (Carver, 1997) was then performed. Due to the variability with separation of items into approach, avoidance and maladaptive factors (Carver, et al., 1989), and the limited support for these factors, an EFA was undertaken to assess all items. No *a prior* designation of items to subscales was done. An oblimin rotation was used allowing items to be correlated as needed and a FIML estimation procedure. Items that loaded upon a factor with a value less than .3 (<.3) or loaded on two factors were dropped from further assessment. For example, item number 9, "I turn to tennis or other activities to take my mind off things" loaded on three factors. These three factors were Self-Blame, Give-Up and Minimization; therefore, this item was dropped (see Appendix E for detail of all items and deleted items).

A 7-Factor solution was obtained with the factor loadings between items moderately strong, between .40 and .90. (detail of all items in Appendix E). Labels were given to factors with attempts to maintain the subscale nomenclature of the Brief COPE scale while also reflecting the items within the factors. Specifically, identified factors were named Active Coping/Planning, Minimization, Spiritual, Humor, Emotional Support, Give-up and Self-blame. (retained items listed in Table 8 below).

It is important to note that items such as positive reframing and acceptance did not load onto a distinct factor. Also, inspection of the factors demonstrated items that are more distinctly categorized as avoidant coping; whereby, there is management of emotion or response to the stressor as opposed to applying a direct effect to change the stressor. The named factors of Self-blame, Give-up and Humor can be more clearly classified as

avoidant coping. The Active Coping / Planning factor grouping is similar to that obtained by Carver and colleagues (1989) with the COPE Scale and Brief COPE Scale (1997). This leaves Spirituality, Emotional Support and Humor that yielded acceptable item loadings but no clear fit with approach or avoidance coping. The factor

Table 8

EFA Factor Loadings for Retained Items of Current Coping Strategies – Seven Factor Solution with Internal Consistencies

Factor with Item	Factor Loading
Active Coping / Planning (alpha = .78)	
1. I concentrate my efforts on doing something the situation I am in.	.56
2. I try to come up with a strategy about what to do.	.51
15. I try to take action to make the situation better.	.64
Minimization (alpha = .42)	
10. I say to myself this isn't real.	.57
11. I say things to let my unpleasant feelings escape.	.47
12. I use alcohol or drugs to make me feel better.	.46
24. I refuse to believe that it is happening.	.40
Spiritual (alpha = .74)	
4. I try to accept the reality of the fact that it has happened.	.43
6. I try to find comfort in my religion or other spiritual beliefs.	.90
20. I pray or meditate.	.87
Humor (alpha = .85)	
5. I make jokes about it.	.87
19. I make fun of the situation.	.86
Emotional Support (alpha = .77)	
7. I get emotional support from others.	.80

Table 8, cont.

8. I try to get advice or help from other people about what to do.	.77
Give-up (alpha=59)	
13. I give up trying to deal with it.	.67
27. I give up the attempt to cope.	.48
Self-blame (alpha = .64)	
14. I criticize myself.	.66
28. I blame myself for things that happen.	.54

labeled Emotional Support contains one item that is indicative specifically of emotional support and one indicative of potentially both emotional and instrumental support. Another example of the ambiguity with categorizing factors is with Humor that demonstrated correlations of the same direction and magnitude with both Action / Planning and Self-Blame. Similar relationships are seen between Emotional Support with both Action / Planning and Minimization. (see Table 9 below).

Table 9

Correlations for Factors of Action / Planning, Minimization, Spirituality, Humor, Emotional Support, Give-up, Self-blame (N = 94)

Measure	1.	2.	3.	4.	5.	6.	7.
1. Action/Planning		.08	.36**	.12	.27**	.13	-.15
2. Minimization	.08		-.12	.10	.11	.24*	.08
3. Spirituality	.36**	-.12		-.04	.18	-.02	-.19
4. Humor	.12	.10	-.04		-.04	.02	.13
5. Emotional	.27**	.11	.18	-.04			

Table 9,cont.

Support							
						-.07	.08
6. Give-up	.13	.24*	-.02	.02	-.07		.07
7. Self-blame	-.05	.08	-.19	.13	.08	.07	

Note. * p < .05, ** p < .01.

A review of the literature indicates that this is a common occurrence (condensed in Table 1 on page 41). Because these factors, namely Humor, Emotional Support and Spirituality could be placed neither beneath approach coping nor avoidance coping, they were eliminated from further analysis. Another fact that provided validation to eliminate the Spirituality items was that less than 10% of all participants (8 of 94) endorsed two of the Spirituality items. These items loaded well because all 8 participants endorsed them strongly, however, there is insufficient variability in this measure to contribute to the model. This is especially true because the literature does not provide a clear indication of how Spirituality would fit within either approach or avoidance. As a result, Spirituality was also discarded. Progression of scale analysis continued with CFA of the covariance matrix within the measurement model below.

Current Avoidance Strategies

Therefore, Minimization, Give-up and Self-blame were retained to be assessed within the measurement model goodness of fit a model with a good fit was revealed, which yielded values with $\chi^2_{(1)} = .03$, ($p = .87$) CFI = 1.00, RMSEA = .00 (.90 = .00 - .15). This model is presented in Figure 7.

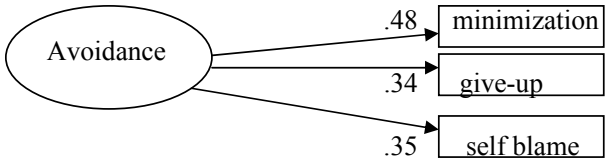
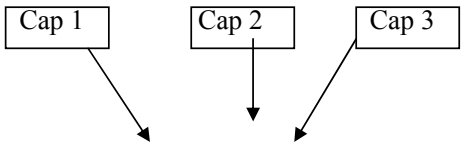


Figure 7. Measurement model for current avoidance coping strategies.

Current Approach Strategies

Because the generation of the Active Coping / Planning Factor is a replication of prior findings, CFA of the covariance matrix was attempted next. Each item was used as an indicator of the latent variable of Current Approach Coping. Subscales defined by single items have the weakest reliability, with doublets also exhibiting low reliability and validity (De Vellis, 2003). It can be seen that there are only three items in the current approach scale, and these were grouped as indicators of approach coping. The approach item of "I think hard about what steps to take" (item 16) had a loading less than .3 and therefore was dropped.

The Cronbach's alpha for the items 1, 2, and 15 (labeled Cap 1, Cap 2, and Cap 3) yielded a value of .66 and therefore, the measurement model was run for these 3 items in an attempt to attain the most parsimonious grouping. The measurement model yielded CFI = .99 (close fit), RMSEA = .07 (reasonable fit) and x^2 = 1.50 p = .22 df = 8, therefore, a measurement model of acceptable fit (see Figure 8)**.**



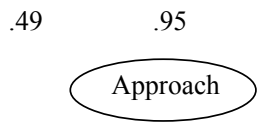


Figure 8. Measurement model for current approach coping.

Assessment of Normality

With variables and indicators thus indentified, an assessment of normality was performed (see Appendix F). It was found that 3 of the 14 variables demonstrated a critical ratio score beyond 1.96 (the 95th confidence interval) and was deemed a small proportion of variables affected by kurtosis.

Summary

In summary, each of the scales within the questionnaire used was evaluated for validity, with indicators for each latent variable identified and the most parsimonious number of items retained. With regard to Primary and Secondary Appraisal, assessment of internal consistency was not needed due to the single item within each measure. Assessment of the Competitive State Anxiety instrument supported prior investigations (Martens, 2003) yielding distinct cognitive anxiety and somatic anxiety scales as indicators. Assessment of the Sense of Social Support measurement instrument yielded a goodness of fit for indicators of the one latent variable. Dispositional Coping and Current Coping were found to be synonymous with this data set, and therefore, only Current Coping Strategies were retained. With the final measurement models completed, the full model was then tested and can be found in Chapter 4.

CHAPTER 4 – RESULTS AND DISCUSSION

This dissertation was designed to identify a conceptual model to describe the stress and coping process among a group of elite female tennis players during a high stakes performance situation. Structural equation modeling was used to analyze the effects of social support, coping strategies, current rank, and cognitive appraisal upon competitive state anxiety. Results will be presented in a series of steps. First, the results of the goodness of fit for the model as a whole will be presented. Second, the significant relationships within the model will be reviewed, including the direct and indirect path values between constructs. Finally, a summary and discussion of results and alignment with the theory of the stress and coping process will be presented.

Results

The TA model is presented below both as operationalized for this dissertation (See Figure 10) and with the resulting paths (See Figure 9). The proposed model yielded acceptable fit indices with $\chi^2_{(65)} = 82.4$ ($p = .07$), CFI = .93, and RMSEA = .05, illustrative of reasonable fit, (.90 = 00 - .09). There are, however, a limited number of significant paths. First, there is a significant path from primary appraisal to secondary appraisal with a value of -.46 ($p < .05$). Second, there is a significant direct path from secondary appraisal to competitive state anxiety (total score = -.34, $p < .05$) Third, there is a significant path from sense of social support to approach coping (total score = .29, $p < .05$). Finally, there is a path that approaches significance from primary appraisal to current avoidance strategies with a total value of direct and indirect paths of .52 ($p = .06$).

The indirect and direct effects are presented in Table 10, which is followed by the trimmed model (Figure 10) and a discussion of each of these effects in more detail.

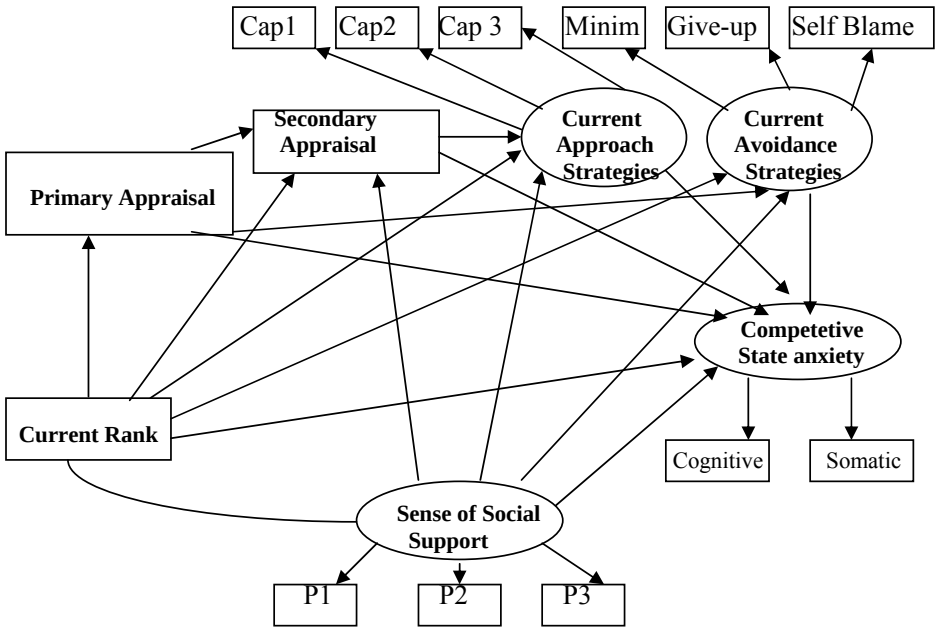


Figure 9. Adjusted proposed model based upon validated measurement models.

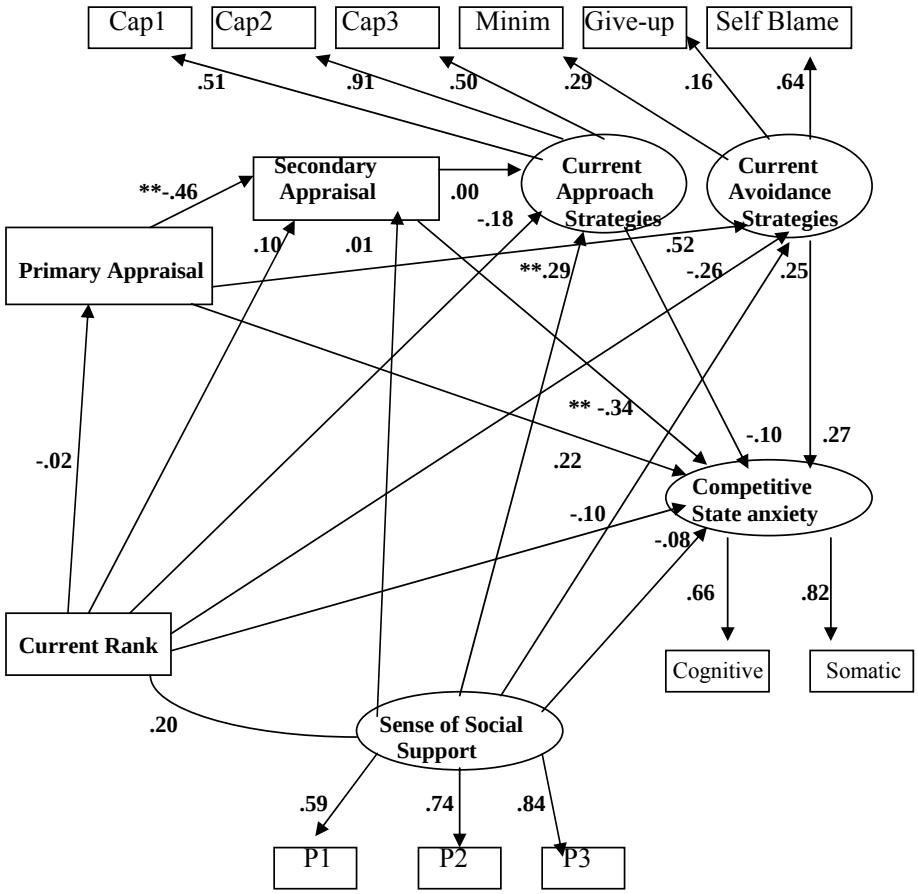


Figure 10. Proposed model with standardized path score values.

Table 10. *Proposed Model: Standardized Path Scores*

	Effects		
Variable	Direct	Indirect	Total
Primary Appraisal			
Current Rank	-.02	--	-.02
Primary Appraisal	--	--	--
Second. Appraisal	--	--	--
SSS	--	--	--
Avoidance	--	--	--
Approach	--	--	--
Secondary Appraisal			
Current Rank	-.10	.01	-.11
Primary Appraisal	-.46*	--	-.46*
Secondary Appraisal			
SSS	.01	--	.01
Avoidance			
Approach			
Approach Coping			
Current Rank	-.18	--	-.18
Primary Appraisal	--	.00	. 00
Secondary Appraisal	.00	.00	.00
SSS	.29*	--	.29*
Avoidance	--	--	--
Approach	--	--	--

Note. SSS = Seeking Social Support. *p<.05.

Table 10, cont.

	Effects		
Variable	Direct	Indirect	Total
Avoidance Coping			
Current Rank	-.26	-.01	-.27
Primary Appraisal	-.52	--	-.52
Secondary Appraisal	--	--	--
SSS	.25	--	.25
Avoidance	--	--	--
Approach	--	--	--
SSS			
Current Rank	--	--	--
Primary Appraisal	--	--	--
Secondary Appraisal	--	--	--
SSS	--	--	--
Avoidance	--	--	--
Approach	--	--	--
State Anxiety			
Current Rank	-.10	-.08	-.18
Primary Appraisal	.22	.13	.35
Secondary Appraisal	-.34*	.00	-.34
SSS	-.08	-.03	-.11
Avoidance	.27	--	.27
Approach	-.10	--	-.10

Note. SSS = Seeking Social Support. *p<.05.

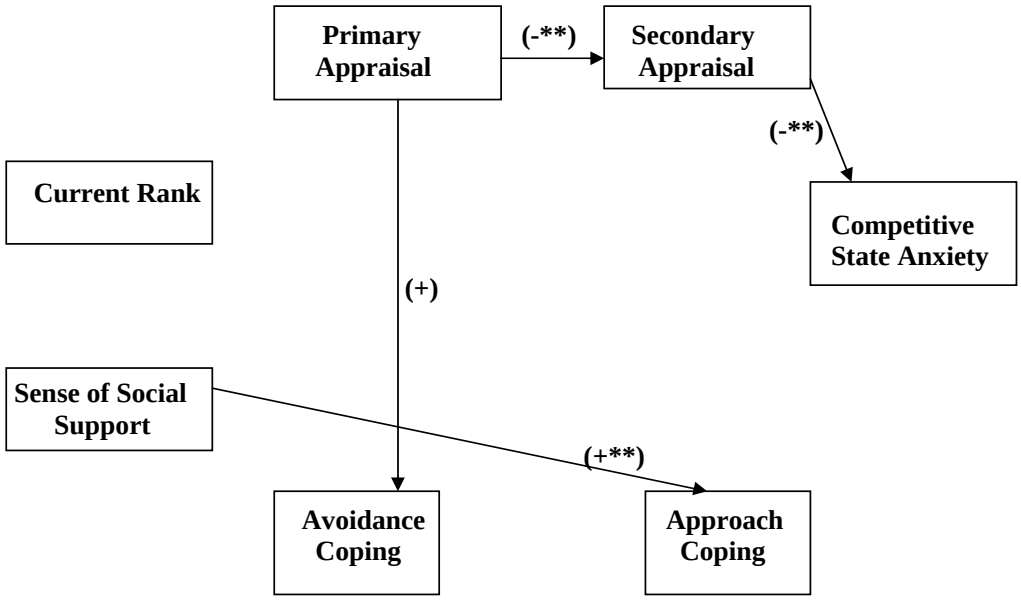


Figure 11. Constructed theoretical model: Significant paths and notable path retained

Note: (**) denotes significant path

Discussion

Primary Appraisal to Secondary Appraisal

This inverse relationship suggests that increases in primary appraisals of threat are associated with lower perceived ability to manage that threat. This finding coincides with prior research. Specifically, Lazarus and Folkman (1984) state that primary appraisal proceeds and influences secondary appraisal. An initial appraisal of threat will quickly proceed towards one's perception of resources or ability to cope; with a high appraisal of

threat being more likely to promote a potentially lower assessment of a person's perceived control over a stressor (Lazarus & Folkman, 1980). Likewise, a low perception will be more likely to be associated with a stronger sense of one's ability to cope.

Anshel (2001) states that threat appraisals reflect state anxiety and contain expectations of harm while also reflecting the uncertainty of a situation. Uncertainty can stem from various sources within a high stakes tennis tournament. For example, there can be uncertainty regarding the outcome of a match, especially in the face of a superior performance of a competitor. This manifests itself as a potential threat to an athlete's monetary winnings, reduction to their ranking points and, as a result, to their ego and self-esteem (Holt, 2003). This is particularly problematic, as primary appraisals involve the motivational relevance of the stressor (Glanz, Lewis, & Rimer, 1997) and also focus upon the features of the situation. Smith and Lazarus (1993) illustrated that a person is likely to exhibit situation-specific distress if they perceive a stressful situation to have high motivational relevance. Perceived threat based upon motivational relevance would be easily elicited at such a high stakes athletic competition because the level of performance at this event functioning as an acute stressor can have a major impact on successful attainment of an athlete's goals for the year (Anshel, 1990; Anshel, Brown ,& Brown, 1993).

Although not tested in this dissertation, the larger perceived threat in this population could be due to the relative youth of the female athletes in professional tennis, with a mean age of 23 years (WTA Tour Age Eligibility Report, 1995). Specifically, although elite athletes can have either performance or mastery goals (Duda, 1989), older

athletes and those with greater experience have reported lower state anxiety because they have less ego-oriented goals (Campen & Roberts, 2001; Hammermeister & Burton, 1995). Because ego-oriented goals center on performance outcomes (Duda, 1989), ego-oriented athletes may be more likely to perceive threat in high stakes events, where they are more likely to face superior competition. This is particularly challenging as the skill of an opponent is outside of one's control, leading to both high perceived threat and low perceived control. As a result, the potential moderating role of goal orientation on the stress process would be a useful extension of this work in future research.

Primary Appraisal Effect upon Avoidance Strategies

This large, though not significant relationship indicates that the perception of threat is associated with the use of avoidant coping strategies such as minimization, giving up and self-blame. This finding is, again, in agreement with the TA model. Folkman et al. (1986) demonstrated that high perceptions of threat promoted avoidance behavior in a sample of adult males and females. This relationship was also demonstrated with college and professional students, whereby negative appraisals were associated with avoidance behaviors such as wishful thinking and fantasy-based coping (Brown, 1994). According to Lazarus and Folkman (1988), individuals who use avoidance strategies with threat appraisals may perceive less potential control over the situation. This interpretation fits well within the population under study, given the above discussion of the inverse relationship between primary and secondary appraisal. That is, these professional tennis players reported lower perceived ability to cope when the perceived threat was high. It is,

therefore, not surprising that they would also resort to avoidant coping under high perceived threat.

In general, avoidant coping behaviors are limited in their adaptive benefit. Avoidance strategies such as venting and distraction can be beneficial in the short term to deal with negative emotions elicited by the stressor, but avoidance coping behaviors often result in detrimental or non-functional outcomes such as reducing adherence to positive health practices or prolonging the stressor (Lerman & Schwartz, 1993; Seligman, 1998). Specifically, because avoidance behaviors do not change the stressor, the stressful situation can be prolonged and can include continued intrusive negative ideas, psychological distress, and somatic discomfort that ultimately can negatively impact performance (Hammermeister & Burton, 2001). This is but one example of the deleterious effects of avoidance strategies upon competitive state anxiety in the short-term and upon physiological measures and health in the long-term (Campen & Roberts, 2001; Mohr, et al., 2002; Soderstrom, Doblier, Leiferman, & Steinhardt, 2000; Tomaka, Blascovich, Kelsey, & Leitten, 1993).

However, the high stakes event under study in this dissertation is a limited stressor. Although the implications of a poor performance may endure, the specific threat of the tournament ends for all players within two weeks. Thus, it may be that professional athletes are more likely to use avoidant coping behaviors when confronting isolated performance stress. Although Hardy et al. (1996) state that the relationship between appraisal and coping strategies among athletes is limited and has been almost ignored, there have been findings that support this interpretation (Anshel 2002; Krohne, 1993).

For example, consider another time-limited stressor, e.g., a situation in which an athlete perceives that the umpire has made an incorrect call. Avoidance coping, such as distraction to avoid thinking about the "bad call," will allow concentration on the tasks within a match (Anshel, 2002). This is an immediate avoidance coping strategy to deal with the short-term stressor.

Likewise, Krohn (1993) states that "turning away from the threat related cues" is an example of avoidance coping within a match that is used to change the appraisal of threat, decrease competitive state anxiety, and ultimately enhance performance. This is a different circumstance when compared to the acute but ongoing stressor of dealing with a competitive event such as a tennis tournament. However, it has been suggested that when the source of the stress is unclear, when the situation is uncontrollable, and also when the measurement of outcomes is immediate, then avoidance coping is the preferred means to deal with the stressor (Roth & Cohen, 1986). In these instances, approach coping might actually increase frustration and manifest as other negative emotions in the same uncontrollable situation. Again, this is an area that has great potential for future research.

Secondary Appraisal to Competitive State Anxiety

The significant direct path from secondary appraisal to competitive state anxiety is another inverse relationship. This can be interpreted to suggest that as secondary appraisals of control increase, competitive state anxiety will decrease—which is supported within related constructs. For example, Bandura's (1986) concept of self-efficacy is a specific form of control that has been associated with performance

enhancement and positive functional outcomes. According to Nadler (1983), belief in personal control contributes to effective coping and help seeking. This is in line with the findings by other investigators who have demonstrated that individuals with perceptions of control are more likely to pursue health screening or problem-solving actions to manage the stressor (Taylor, Helgeson, Reed, & Skokan, 1991) and improve psychological adjustment. This makes intuitive sense within an elite athlete population and has been supported with the construct of competitive state anxiety in other investigations.

If an athlete perceives that they have control over a situation, if they perceive an ability to change the situation, they would more likely want to strive to do something about the situation that they are finding uncomfortable or unsatisfactory. Adjustment of the stressor would thereby decrease the cognitive and somatic discomfort associated with competitive state anxiety. In an investigation to identify the antecedents to competitive state anxiety, elite tri-athletes were assessed regarding perception of threat, control and coping efforts. All three in combination were found to be better predictors of competitive state anxiety than any one alone, and this finding is similar to the finding within this investigation between measured threat, control, and competitive state anxiety.

Based upon these findings, increased control would decrease competitive state anxiety and therefore, an area of future investigation would be to measure the impact of an intervention upon state anxiety and a further extension with effects upon performance. These aspects of coping effectiveness have not been investigated with this elite group and

could validate the allocation of resources to an expansion of the Athlete's Assistance Program in promoting player health and performance enhancement.

***Sense of Social Support to** Approach Coping*

The remaining significant path is from sense of social support to approach coping (total score = .29, $p < .10$). This significant, positive relationship suggests that as an individual perceives a greater sense of social support, they are more likely to use approach coping such as planning to try to change the source of stress. This finding supports the role of social support within the theory of the TA model and could be due to actual encouragement given by the individuals within the social network.

The positive significant relationship between sense of social support and approach coping suggests that, as individuals perceive greater social support, they are more likely to use approach coping such as planning or trying to change the stressor. With a higher sense of social support, an individual will have a resultant lower state anxiety level as illustrated by the indirect path score from social support to state anxiety. Thus, individuals within an athlete's network can contribute to reappraisals or appraisals of control and promote a decrease in competitive state anxiety as theorized by the TA model. The mechanism within this relationship is unclear; however, it could be that an athlete may feel that the people they have access to can provide resources and skills to change their environment. A limitation within this investigation is that the one-time data collection does not allow for assessment of reciprocal relationships. Therefore, it is not possible to ascertain whether, because these athletes were using planning (approach

coping strategies), this gave them a greater sense of social support. The impact of individual coping upon social relationships and the social relationships upon coping strategies adopted by an individual has resulted in the concept of communal, prosocial coping (Wells, Hobfoll, & Lavin, 1997).

Communal coping takes into account the individual as well as community aspects. There is a prosocial-antisocial dimension and an active-passive dimension. An individual may consider how the coping strategy will affect others and choose to delay (passive) or not perform a direct action upon the stressor if they perceive that this will create distress upon another person. Within the antisocial side of this spectrum, a person would not take into account potential or perceived distress within the social community but act upon the stressor. Women have been found to use more prosocial coping as opposed to men, who use more antisocial coping (Dunahoo, Hobfoll, Monnier, Hulsizer, & Johnson, 1998). Therefore, this use of prosocial coping may be an aspect of the avoidance strategies used at a Grand Slam event, where an athlete will have a larger than normal entourage in attendance. Families, agents, friends, and significant others will attend a large event such as this, as opposed to events throughout the year when the athlete may only have to consult with one person, the coach, when coping with various stressors.

The indirect effect of social support upon competitive state anxiety through approach coping is small and non-significant, however, the direction of this relationship suggests that social support may function through approach coping strategies to decrease state anxiety in addition to its direct effect upon competitive state anxiety. This coincides with findings that social support functions in conjunction with coping skills to diminish

the deleterious effects of situational and life stress on injury in athletes (Smith, Smoll, & Ptacek, 1990). Smith and colleagues identify the conjunctive and moderating effects of social support with life stress upon injury. It may be that the effect of social support upon competitive state anxiety could work in conjunction with the profile of an athlete such as high, moderate, and low trait anxiety or high and low life stress, similar to the relationship found with injury. Again, this important aspect of social support within this elite, athletic population merits further inspection.

Null Effects

Within this investigation, a number of expected relationships did not emerge as significant. A number of these were of a similar magnitude to other paths, e.g. from sense of social support to avoidance strategies and from both primary appraisal and avoidant coping to state anxiety. Each of these were greater than .20 but were non-significant. This may be explained by low power. As was mentioned in Chapter 3, the power analysis revealed that a sample size of 98 would provide sufficient power for the models' x^2 test. However, though sampling was done at 2 events to obtain a normal distribution, based upon the unique characteristics of this population, the data obtained had a skewed distribution. Therefore, in this situation, it is recommended that the number of subjects be equal to 10 times the number of parameters that must be estimated. This would result in a needed sample size of 570 at minimum. This is beyond the size of the population of interest, so that a discussion of these relationships is tenuous at best and, instead, should await testing within a larger sample.

Other null effects, such as the inverse effect of approach coping on state anxiety, were predicted within the model but were neither supported nor evidenced a large effect. The lack of even a small path suggests that these are true null effects within this population. As a result, they require further discussion.

A factor that could be at work within this sample is the effect of gender upon selection of coping strategies. It was not possible with this research design nor a purpose of this investigation to assess the effect of gender upon the selection of approach versus avoidance coping strategy. However, prior investigations have found that female athletes preferentially use avoidance strategies when compared to males (Campen & Roberts, 2001; Hammermeister & Burton, 1995; Highlen & Bennet, 1983; Parker & Endler, 1990). Specifically, female athletes have been demonstrated to use socially supportive strategies (Anshel, 2000a; Porter & Queck, 1983). These strategies are categorized as avoidance strategies when the elements of functionality and instrumentality are removed from the definition of avoidance strategies, as was done within this investigation. The effects of gender within this group could be impacting the measurement of coping strategy and thus masking the full effect of social support upon avoidance. Though not a significant path, the value of the effect from sense of social support to avoidance coping was almost of the same magnitude as that of approach coping. If any contributing effect of gender could be quantified and separated from the effect of social support, there may emerge a greater path value difference between social support upon approach and social support upon avoidance strategies and a more definitive assessment of these relationships provided.

It is also surprising that there is neither a large nor significant direct path from sense of social support to competitive state anxiety. This differs from findings by prior investigators, where social support has been demonstrated to have a positive effect upon immune function and other health outcomes (Cohen, 1998; Dolbier & Steinhardt, 2000). Likewise, seeking social support was positively correlated with health outcomes in job-related stressors—although it was negatively associated with health in relationship-related stressors. These authors hypothesized that with regard to job-related stressors, social support may provide sympathy or tangible help that improves the work-related problem or reduces the individual's negative affect. It would be expected, therefore, that social support would positively impact emotion and the stress of the moment for tennis players. For example, Campen and Roberts (2001) showed that social support can decrease the manifestations of stress among elite athletes. However, in a recent meta-analysis (Penley, Tomaka, & Weibe 2002), a relationship between seeking social support and positive health outcomes was not supported. The type of health outcome such as psychological versus physical and situational characteristics such as controllability and duration moderated the associations. These authors make the distinction that the characteristic of controllability of the stressor moderated the effect between social support and health outcomes. Specifically, stressor duration moderated the association, with seeking social support being significantly correlated with health outcomes for acute stressors but not for chronic stressors. In addition, controllability moderated the overall association, with seeking social support being significantly correlated with controllable stressors but not for uncontrollable stressors. An example of this would be an athlete who

is experiencing mild symptoms of injury may seek assistance from the PHCP at a Grand Slam event and attain positive outcomes with healing due to early intervention and enhanced performance with equipment adjustments. An example of seeking social support in an uncontrollable situation would be the situation in which an athlete looks to the coach or entourage for assistance to manage a stress fracture during the event. This athlete may continue to experience pain and poor performance due to the uncontrollability of this type of injury that necessitates time for recovery.

There is also a difference between seeking social support, receiving social support, the perception of having social support at all, and the functionality of social support. Although the findings indicated that the Sense of Social Support Scale was a statistically valid measure to assess perception of social support, as a global measure of social support it gives an indication of the perception of support without a sense of the function of that support. These distinctions may account for some of the variability with the current findings and those from earlier research.

A strong effect was also expected between current rank (reflecting tennis ability) and competitive state anxiety. This expected inverse relationship was not supported. It has been demonstrated that, due to the adoption of less ego threatening goals and due to specific participation motives, cognitive state anxiety decreases with age among certain elite athletes (Hammermeister & Burton, 1995; Martens et al., 1990). Athletes with a higher current rank would be expected to have a higher sense of their perceived ability and therefore, less threat in a competitive situation. Though the relationship between current rank and state anxiety was an inverse one, the anticipated strong path score was

not demonstrated. Age was not included as a factor within this investigation. It may be that it is age, not ability, that drives the development of task rather than an ego orientation. For example, an increased level of experience among athletes was found to be negatively related to heightened cognitive anxiety (MacGregor & Abrahamson, 2000). In most sports, there is a strong correlation between age and rank, as skills are mastered over time. In contrast, tennis players often reach their peak prior to age 24, although athletes have known to compete well past age 35. As a result, a comparison of age and rank bears future investigation within this population. A better understanding of these relationships could provide support for the current age eligibility rule that limits athletes from participating in a full year-round schedule until they reach the age of 17 years.

Limitations

As with all exploratory investigations, caution should be used when interpreting these results and attempting to generalize to a larger population. Specifically, limitations within this investigation that merit caution with regard to generalization have been presented. A significant limitation with this investigation is the small sample size relative to the model complexity. It is possible that the smaller paths are significant relationships that are obscured by the low power of this investigation. The p to N ratio can not be ignored and dictates caution with interpretation of all conclusions.

Thus far results have been presented with discussion to account for these results. Discussion has also included rationale for the lack of results that could have been

demonstrated. The following chapter is a presentation of implications with practical application of these findings and recommendations for future direction of investigation.

CHAPTER 5. IMPLICATIONS AND CONCLUSION

A doctorate in education is intended to prepare a student for program design, implementation and assessment. Therefore, this chapter will present the implications of the findings within this investigation. Because the WTA presently provides an intervention that incorporates stress management, I will begin this discussion with a description of that program and how it might be improved in response to this dissertation. Potential clinical application to future interventions with this group of elite athletes in the management of stress and promotion of effective coping will also be suggested.

Implications of Findings

The WTA Tour has an Athletes Assistance Program (AAP) delivered by the Primary Health Care Providers (PHCPs) who provide health care for these athletes during competitive events. The program was developed as a source of intervention in an acute stress situation, specifically, to assist with managing a common stressor, namely injury. This program was also designed to provide information regarding injury prevention, injury treatment, and other health issues. This includes some efforts at stress management, including specific coping strategies that emphasize approach over avoidant coping. However, although PHCPs have an understanding of the physiological stress response within their academic preparation, there is minimal information regarding stress management and the cognitive aspects of the stress response, if any, in the PHCP academic preparation. As a result, the stress management component of the intervention is generally manifest as the provision of social support. The PHCPs provide an attentive

ear for an athlete distressed by a variety of personal and performance issues (Kathy Martin, WTA Tour PHCP, personal communication, 2004). Thus, the AAP program might be more effective if the PHCPs received specific training in the relationships of variables within the TA model, especially as they relate to the findings of this dissertation.

Sense of Social Support

The global measure of social support was supported with the data in this sample and further demonstrates the validity of the Sense of Support Scale described by prior investigators (Dolbier & Steinhardt, 2000). Future investigation could include a social support scale measurement that would differentiate the function of the relationships that exist for these athletes. Functional aspects of interactions with individuals would include emotional support, instrumental assistance, or even information seeking. Future investigation could also delineate the roles of specific individuals for this group. Questions that could be answered include "How prevalent is it that the coach is the only source of support?" and "Does this exclusive source of social support during competition enhance coping or does it increase anxiety?" This would provide clarity regarding how actions by individuals within the athlete's social network contribute to the coping strategies used by elite athletes. Many additional questions could be investigated based upon the identified relevant paths within the TA model from this investigation.

The value of social support as a means to facilitate recovery from injury and illness is well documented (Bianco, 2001; Duda, Smart, & Tappe, 1989; Manuel et al, 2002), and because the PHCPs interact with the athletes on a day-to-day basis, they not

only can be, but appear to generally are, a source of social support during competitive events. As a result, there is little need to address social support in this sample. Instead, my experience suggests that appraisal and coping issues provide greater potential for intervention.

Assessment of Appraisal

When an athlete walks into the training room or the clinical setting, they are usually greeted and then asked "How are you feeling today?" This is common practice with any health care practitioner. However, the parsimonious measure of primary appraisal used within this investigation can prove helpful in this clinical athletic setting. An athlete that expresses limited perceived control in managing the stress of the upcoming event can be targeted for further intervention such as education, media training, or training ideas for surface transitions as well as being provided with improved support as needed. Thus, rather than limit its use to research settings, a measure of appraisal could serve as both a means of instruction for PHCPs and a diagnostic tool to guide further discussion.

It may not be appropriate to regularly ask a question regarding level of perceived threat or one's ability to meet the stressor of an event. However, threat/coping assessments could be a proactive, efficient means to initiate an intervention during certain high risk situations, e.g. participating in a Grand Slam event, responding to an injury, or dealing with recent poor play. This could be done with all athletes, but may prove particularly helpful with less experienced athletes, who may not have developed coping strategies, or with athletes who have not anticipated the stress of these issues. For

example, a Grand Slam event exposes athletes to a higher level of competition, more media appearances, more night matches, and other tournament-specific environmental conditions than they experience in any other event (WTA Tour Age Eligibility Report, 1995). In addition, any interaction with a PHCP should be documented, and the previous history could be used to inform future interactions, to tailor intervention, and to decrease repetition with an athlete.

Role of Appraisal

The sizable path coefficients reveal theoretically supported relationships within the stress and coping process. The largest relationships were for the effect of primary appraisal upon secondary appraisal (-.46), primary appraisal upon avoidance coping (.53) and secondary appraisal upon competitive state anxiety (-.35). Thus, these merit our attention when considering future intervention. If perception of threat and control are driving much of the effect upon state anxiety during high stakes performance, it behooves us to provide a means to intercede to modify these perceptions. An example includes the COPE model (Anshel, 2001c; Anshel, Gregory, & Kaczmarek, 1990). Originally developed using a qualitative study design with deductive content analysis, the COPE program consists of Control of emotions, Organizing of feedback, Planning responses and Executing responses. An investigation to assess the effectiveness of this program used 39 elite athletes (24 male baseball and 15 female softball players). Results demonstrated the effectiveness of cognitive restructuring to enhance control and causal attributions of performance among female athletes (Anshel, Gregory & Kaczmarek, 1990). The negative effect associated with acute psychological stress due to unpleasant

feedback was also minimized with this inoculation training. Thus, athletes who are taught to redirect cognitive involvement toward relevant external cues appear to be better able to avoid "paralysis by analysis" (Anshel, et al., 1990). This program was similar to the intervention described by Curry & Maniar (2003), which also included visual imagery and relaxation strategies.

The athletes in both studies demonstrated an improved ability to deal with the demands of competition. These results complement the findings from this intervention regarding the role of appraisal in choosing coping behaviors and state anxiety and suggest that the inclusion of training similar to that described by the COPE program could promote a greater sense of control, decrease threat, decrease anxiety, and enhance performance.

The role of avoidant strategies is also important to consider. Within this investigation, the path score from threat to avoidance strategies illustrated a strong positive relationship. Nonetheless, the use of avoidance strategies may be beneficial when there is limited control (Seligman, 1998). This appears to be the case in a tennis match with poor officiating or other environmental elements. However, the use of self-blame and giving up, as was endorsed in the present data, do not represent the most adaptive forms of avoidant coping that are available to these athletes. Instead, PHCPs could be trained to deliver a structured program with components of more adaptive avoidant strategies, e.g. relaxation methods and visualization in moments of acute stress. Providing specific acute stress intervention training for these professionals has a number of advantages. It is likely to lessen the deleterious effects of threatening and low control

appraisals upon competitive state anxiety. It is also likely to prevent the withdrawal of effort or negative self-talk that are commonly utilized. Both effects would be expected to benefit performance. Athletes could also be taught to incorporate effective approach coping strategies to decrease the long-term effects of more controllable stressors.

Program development

The use of a training program assumes that athletes can be trained to develop coping methods that will be useful for future stressors. The aspects of coping with acute stress discussed within this dissertation are, in contrast, all within the present tense. The coping literature usually pertains to reactive coping to deal with harm or loss that has already occurred. Anticipatory coping is also discussed pertaining to stressors that will occur in the near future, such as an athletic competition tomorrow or later today. However, there is a newly emerging development of proactive coping research that deals with preparing to manage future stressors (Aspinwall & Taylor, 1997). Anticipated stressors can include an imminent company merger, a mid-term exam, or a Grand Slam event later in the year. This newly emerging aspect of coping can have particular relevance for these athletes, as they will have four of these high stakes events per year. There are five components of proactive coping: (a) building resources to be used as a reserve, such as social resources or financial resources; (b) recognizing potential resources; (c) appraising potential stressors; (d) making initial coping efforts; and (e) using feedback regarding the success of coping efforts (Aspinwall, 2003). Proactive coping involves future challenges that are potentially self-promoting. The individual who

uses proactive coping builds resources not just as a reserve, but also in order to achieve goals that are associated with personal and professional growth.

Therefore, one strategy that would address three areas of proactive coping to include building resources, recognition of potential resources, and eliciting feedback is education of the athlete about media communication. A second review of the WTA Tour Age Eligibility Rule, done in 2005, revealed that stress from injury and the media were two of the most frequent stressors during competitive events for these athletes (WTA Tour Age Eligibility Report, 2005). Some professional athletes receive media training; however, basic media training could be delivered by the PHCPs who, as WTA Tour staff, have received media training themselves. Basic information about the role of media and referral of players to media experts who work for the WTA Tour would help to provide information to the athlete and thereby decrease the threat or fear of the unknown regarding dealing with media personnel at competitive events.

Another aspect of the AAP that could be improved to manage potential stress is goal setting education. All athletes could be given basic goal setting information at a mandatory player meeting, with instructions to meet with PHCPs for further information. Assistance with goal writing could facilitate a focus upon challenging, mastery goals instead of solely upon performance outcomes upon which coaches, parents, and agents often tend to focus (WTA Tour Age Eligibility Report, 1995). Unlike these individuals, the PCHPs have no incentive for the immediate success of any athlete. They are, as a result, well placed to provide this training. A specific example would be focus on mastery goals that can be highly motivating (Duda, Smarte, & Tappe, 1989) and can substitute the

threat of performance failure with empowering interpretations of the match to come, the media interview, or other stressors associated with a Grand Slam or other high stakes event.

Conclusion

The outcomes obtained through this investigation enhance measurement in the area of stress and coping. Specifically, the appraisal measurements and social support measure used and validated with the measurement models are relevant and provide clear application to an elite athlete population. Furthermore, the multi-dimensional aspect of competitive state anxiety (Martens, 2003; Martens et al., 1990; Ryska, 1993a) was replicated. The latent variables of primary appraisal, secondary appraisal, current approach coping, current avoidant coping, and social support are measurable within this population and contribute to the stress response. There is little information regarding this group and no information pertaining to the manifestation of stress and coping strategies used by these elite athletes. The resultant conceptual model provides a starting point for future investigation of this population and other elite female athletes during performance situations.

Finally, the obtained conceptual model supports the assertion by other investigators regarding the complexity of the investigation of stress, coping, and the appraisal process (Anshel & Anderson, 2002; Lazarus, 2000) with attempts of over-simplification leading to missed opportunities for clear construct delineation.

The sample used within this investigation is unique, and the number of participants has been small. Although caution should be used when generalizing results from this investigation, findings do provide support for the relationships within the TA model, and variations specific to the investigation of elite athletes provide valuable insight. Within this investigation, the immediate outcome of coping strategies was measured as competitive state anxiety. This investigation is one of few in the area of sport psychology that attempt to assess the cognitive and behavioral processes to follow the use of coping strategies and therefore, advances the available sports psychology literature (Anshel, 2001c). There is much needed investigation in the area of appraisal assessment as well as the various dimensions of social support. The conceptual model constructed as a result of this investigation can help guide further research and provide immediate support for interventions to enhance coping among elite athletes.

APPENDIX A
CONSENT FORM

UTA IRB #2004-06-0091

Informed Consent to Participate in Research
Athletes

The University of Texas at Austin (UTA)
The University of Texas at San Antonio (UTHSCSA)

You are being asked to participate in a research study. This form provides you with information about the study. Catherine Ortega will also describe this study to you and answer all of your questions. Please read the information below and ask questions about anything you don't understand before deciding whether or not to take part. Your participation is entirely voluntary and you can refuse to participate without penalty or loss of benefits to which you are otherwise entitled.

Title of Research Study:
Evaluation of an Acute Stress Intervention Program for Elite Athletes

Principal Investigator(s), University of Texas affiliation and Telephone Number(s):
Catherine Ortega; Doctoral Candidate at UTA; 210-218-7887
John B. Bartholomew, PhD; Associate Professor and Faculty Sponsor, UTA; 512-232-6021.

Funding Source: none.

What is the purpose of this study?
The purpose of this study is to evaluate the WTA Tour's Athlete's Assistance Program (AAP) as a means to teach and facilitate the implementation of effective coping strategies among elite athletes.

What will be done if you take part in this study?
You are one of 150 tennis players that will participate in this study and you will be asked to answer a questionnaire. This questionnaire will consist of items regarding your thoughts and feelings about this tournament and others and the ways in which you deal with stress. The questionnaire that you will answer will take approximately 20 minutes to complete. Athletes that participate in this study, will grant permission for the Primary Investigator to be provided with information regarding their medical history to include utilization of the services of the Athlete's Assistance Program. Confidentiality will be maintained by entering data with code numbers after it has been collected. There will be no personal identifying information associated with the data after collection.

What are the possible discomforts or risks?

Feelings of deficiency or dysfunction could be experienced when describing past or present coping strategies or present feelings of anxiety. These will be allayed with debriefing immediately following the data acquisition, with the investigator explaining that these feelings are normal and not necessarily an indicator of dysfunction. Participants will be instructed that should they feel unable to cope with emotions secondary to participation in this study, they should contact a WTA Tour PHCP for intervention and also be informed that the Value Options helpline (1-877-573-2834) is available 24 hours per day and provides acute stress intervention (free of charge) for athletes.

There is a possibility that participants may experience instrument fatigue. All participants will be given as much time as needed to complete this questionnaire, however, all questions are closed-ended objective questions and kept short to decrease this fatigue.

What are the possible benefits to you or to others?
There are no benefits to participation for the subjects in this study, beyond feelings of satisfaction for participating in a research project and contributing to the evaluation of a WTA Tour endeavor.

If you choose to take part in this study, will it cost you anything?
This study will only cost you approximately 20 minutes of your time.

Will you receive compensation for your participation in this study?
No, there will be no compensation for your participation.

What if you are injured because of this study?
There should be no physical injuries resulting from this study and therefore, no medical treatment will be provided to participants during or after this study.

If you do not want to take part in this study, what other options are available to you?
Participating in this study is entirely voluntary. You are free to refuse to be in the study, and your refusal will not influence current or future relationships with the University of Texas in Austin or the WTA Tour.

How can you withdraw from this research study and whom should you call with questions?

If you wish to stop your participation in this research study for any reason, you should contact: John Bartholomew, Ph.D., at (512) 232-6021. You are free to withdraw your consent and stop participation in this research study at any time without penalty or loss of benefits for which you may be entitled. Simply return the form which will be destroyed or take it with you. Throughout the study, the researchers will notify you of new

information that may become available and that might affect your decision to remain in the study.

In addition if you have question about your rights as a research participant, please contact Clarke A. Burnham, Ph.D., Chair, The University of Texas at Austin Institutional Review Board for the Protection of Human Subjects, (512) 232-4383 or Wayne P. Pierson Ph.D., Chair, The University of Texas Health Science Center at San Antonio Institutional Review Board, (210) 567-2351.

How will your Privacy and the confidentiality of your research records be protected?

Authorized persons from the University of Texas at Austin and the Institutional Review Board have the legal right to review your research records and will protect the confidentiality of those records to the extent permitted by the law. Your research records will not be released without your consent unless required by law or a court order.

If the results of this research are published or presented at scientific meetings, your identity will not be disclosed.

Will the researchers benefit form your participation in this study?
No benefit beyond the ability to present these results as a doctoral dissertation and possibly future publication will be derived by the primary investigator and associate investigator.

We will give you a signed copy of this form to keep.

Signatures:

As a representative of this study, I have explained the purpose, the procedures, the benefits and the risks that are involved in this research study:

Signature and printed name of person obtaining consent Date

You have been informed about this study's purpose, procedures, possible benefits and risks, and you have received a copy of this Form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other question at any time. You voluntarily agree to participate in this study. By signing this form, you are not waiving any of your legal rights.

Printed Name of Subject Date

Signature of Subject	**Date**
Signature of Principal Investigator	**Date**

APPENDIX B
COMPETITION QUESTIONNAIRE

Competition Questionnaire

NAME: _____

Directions: These two questions are related to your tennis experience. Write in the numbers appropriate to answer the question.

In the course of your playing career, how many events similar to this one have you competed in before this week?_____

What is your current ranking? _____

There are many reasons that people will consider an event to be a threat or to have pressure. There is the potential to lose points or money, create difficulty with a sponsor, or anxiety over your performance. Keep in mind that the feelings of threat or pressure are separate from your ability to cope with the situation. So, some people might view an event to be threatening, but are confident in their ability to cope with it, while others might feel that they are unable to deal with the threat or pressure.

Directions: Please answer the following questions about this event dealing with how threatening you feel the event is and your ability to cope with this threat. When answering, please think beyond your next match and consider the tournament as a whole.

(1) How much of a threat (pressure) do you feel this tournament presents to you?

1	2	3	4	5
not at all	slight/ small amount	moderate amount	great amount	excessive amount

(2) How able are you to cope with this threat (pressure)?

1	2	3	4	5
not at all able to cope	slightly able to cope	moderately able to cope	strongly able to cope	no problem to cope

DIRECTIONS: The following is a list of action items. Check the box that corresponds to **how you USUALLY try to deal** with stressful, threatening or pressure situations **AND THEN** check the box that corresponds to **how you ARE CURRENTLY—at this event--- trying to deal with stressful, threatening or pressure situations.**

ACTION		This not at all	This somewhat	This a great deal
1.. I concentrate my efforts on doing something about the situation I'm in.	**Usually do**			
	Right now doing			
2. I try to come up with a strategy about what to do.	**Usually do**			
	Right now doing			
3. I try to see it in a different light, to make is seem more positive.	**Usually do**			
	Right now doing			
4. I try to accept the reality of the fact that it has happened.	**Usually do**			
	Right now doing			
5. I make jokes about it.	**Usually do**			
	Right now doing			
6. I try to find comfort in my religion or spiritual beliefs.	**Usually do**			
	Right now doing			
7. I get emotional support from others.	**Usually do**			
	Doing right now			
8. I try to get advice or help from other people about what to do.	**Usually do**			
	Doing right now			
9. I turn to tennis or other activities to take my mind off things.	**Usually do**			
	Doing right now			
10. I say to myself "this isn't real".	**Usually d**			
	Doing right now			
11. I say things to let my unpleasant feelings escape.	**Usually do**			
	Doing right now			
12. I use alcohol or other drugs to make myself feel better.	**Usually do**			
	Doing right now			
13. I give up trying to deal with it.	**Usually do**			
	Right now doing			

ACTION		This not at all	This somewhat	This a great deal
14. I criticize myself.	**Usually do**			
	Right now doing			
15. I take action to try to make the situation better.	**Usually do**			
	Right now doing			
16. I think hard about what steps to take.	**Usually do**			
	Right now doing			
17. I look for something good in what is happening.	**Usually do**			
	Right now doing			
18. I learn to live with it.	**Usually do**			
	Right now doing			
19. I make fun of the situation.	**Usually do**			
	Right now doing			
20. I pray or meditate.	**Usually do**			
	Right now doing			
21. I get comfort and understanding from someone.	**Usually do**			
	Right now doing			
22. I get help and advice from other people.	**Usually do**			
	Right now doing			
23. I do something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping or shopping.	**Usually do**			
	Right now doing			
24. I refuse to believe that it is happening.	**Usually do**			
	Right now doing			
25. I express my negative feelings.	**Usually do**			
	Right now doing			
26. I use alcohol or other drugs to help me get through it.	**Usually do**			
	Right now doing			
27. I give up the attempt to cope.	**Usually do**			
	Right now doing			
28. I blame myself for things that happen.	**Usually do**			
	Right now doing			

Directions: A number of statements that athletes have used to describe their feelings before competition are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now at this event. There are no right or wrong answers. Do not spend too much time on any one statement but choose the answer which describes your feelings right now.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I am concerned about performing poorly……	1	2	3	4
2. I feel jittery……..	1	2	3	4
3. I am concerned that I may not do as well in this tournament as I should…	1	2	3	4
4. My body feels tight……..	1	2	3	4
5. I am concerned about losing……	1	2	3	4
6. I feel tense in my stomach……	1	2	3	4
7. I am concerned about choking under pressure……	1	2	3	4
8. I'm concerned that others will be disappointed with my performance…..	1	2	3	4
9. My heart is racing……..	1	2	3	4
10. I feel my stomach sinking……..	1	2	3	4
11. My hands are clammy……..	1	2	3	4
12. My body feels tense……	1	2	3	4

Directions: The following are a number of statements to describe the support that you feel is available to you. Circle the number that best describes what is GENERALLY TRUE for you. WTA Staff are the Sport Sciences and Medicine Department members.

.	NOT AT ALL TRUE	SOMEWHAT TRUE	MODERATELY TRUE	VERY TRUE
1. I participate in volunteer/ service projects.	1	2	3	4
2. I have meaningful conversations with my parents and /or siblings.	1	2	3	4
3. I have a mentor(s) in my life I can go to for support / advice.	1	2	3	4
4. I seldom invite others to join me in my social and /or recreational activities.	1	2	3	4
5. There is at least one person I feel a strong emotional tie with.	1	2	3	4
6. There is no one I can trust to help solve my problems.	1	2	3	4
7. I take time to visit with my neighbors.	1	2	3	4
8. If a crisis arose in my life, I would have the support I need from family and / or friends.	1	2	3	4
9. I belong to a club, such as related hobby, support group, special interest, sport.	1	2	3	4
10. I have friends from work that I see socially (such as movie, dinner etc)	1	2	3	4
11. I have friendships that are mutually fulfilling.	1	2	3	4
12. There is no one I can talk to when when making important decisions in my life.	1	2	3	4
13. I make an effort to keep in touch with friends.	1 1	2 2	3 3	4 4

14. My friends and family feel comfortable asking me for help.	1	2	3	4

Directions: The following are a number of statements to describe the support that you feel is available to you. Circle the number that best describes what is GENERALLY TRUE for you.

	NOT AT ALL TRUE	SOMEWHAT TRUE	MODERATELY TRUE	VERY TRUE
15. I find it difficult to make new friends.	1	2	3	4
16. I look for opportunities to help and support others.	1	2	3	4
17. I have a close friend(s) whom I feel comfortable sharing deeply about myself.	1	2	3	4
18. I seldom get invited to do things friends.	1	2	3	4
19. I feel well supported by my friends and / or family.	1	2	3	4
20. I wish I had more people in my life that enjoy the same interested as I do.	1	2	3	4
21. There is no one that shares my beliefs and attitudes	1	2	3	4

APPENDIX C
COMPETITIVE STATE ANXIETY–2R ITEM FACTOR LOADINGS

CFA Two-Factor Solution for the Revised Competitive State Anxiety Inventory – 2 (CSAI-2R) with FIML and oblimin rotation used

Item/Scale	Factor 1	Factor 2
Cognitive Scale (α = .85)		
1. I'm concerned about performing poorly.	.89	
3. I'm concerned that I may not do as well in this tournament as I should.	.80	
5. I'm concerned about losing.	.79	
7. I'm concerned about choking under pressure.	.55	
8. I'm concerned that others will be disappointed with my performance.	.54	
Somatic Scale (α = .82)		
2. I feel jittery.		.39
4. My body feels tight.		.37
6. I feel tense in my stomach.		.47
9. My heart is racing.		.83
10. I feel my stomach sinking.		.79
11. My hands are clammy.		.45
12. My body feels tense.		.55

APPENDIX D
SENSE OF SOCIAL SUPPORT FACTOR LOADINGS AND DESCRIPTIVE STATISTICS

EFA Factor Loadings and Descriptive Statistics for the Sense of Social Support Items – Single Factor Solution with FIML and Oblimin rotation used

Item	Factor Loading	Mean (SD)	Range
1. I participate in volunteer service projects.	.05	1.9 (.94)	1.0 – 4.0
2. I participate in meaningful conversations with my parents or siblings.	.18	3.17 (.88)	1.0 – 1.40
3. I have a mentor(s) in my life I can go to for support / advice.	.10	3.47 (.65)	1.0 – 4.0
4. I seldom invite others to join me in my social and / or recreational activities.	.01	3.32 (1.4)	1.0 – 4.0
5. There is at least one person I feel a strong emotional tie with.	.45	3.63 (.69)	1.0 – 4.0
6. There is no one I can trust to help solve my problems.	.57	3.66 (.74)	1.0 – 4.0
7. I take time to visit with my neighbors.	.26	1.72 (.98)	1.0 – 4.0
8. If a crisis arose in my life, I would have the support I need from families and / or friends.	.40	3.73 (.57)	1.0 – 4.0
9. I belong to a club, such as related support group, special interest sport.	.30	1.95 (1.26)	1.0 – 4.0
10.I have friends from work that I see socially (such as movie, dinner etc).	.60	2.71 (1.08)	1.0 – 4.0
11. I have friendships that are mutually fulfilling.	.70	3.16 (.93)	1.0 – 4.0
12. There is no one I can talk to when making important decisions in my life.	.25	3.76 (.67)	1.0 – 4.0
13. I make an effort to keep in touch with friends.	.35	3.06 (.90)	1.0 – 4.0
14. My friends and family feel comfortable asking me for help.	.52	3.43 (.75)	1.0 – 4.0
15. I find it difficult to make new friends.	.19	3.18 (.96)	1.0 – 4.0
16. I look for opportunities to help and support others.	.03	3.04 (1.18)	1.0 – 4.0
17. I have a close friend(s) whom I feel comfortable sharing deeply about myself.	.63	3.23 (1.01)	1.0 – 4.0
18. I seldom get invited to do things with friends.	.03	3.34 (.85)	1.0 – 4.0
19. I feel well supported by my friends and / or family.	.40	3.58 (.68)	1.0 – 4.0
20. I wish I had more people in my life that enjoy the same interests as I do.	.22	2.87 (1.13)	1.0 – 4.0
21. There is no one that shares my beliefs and attitudes.	.17	3.67 (.69)	1.0 – 4.0

APPENDIX E
INTERNAL CONSISTENCIES AND FACTOR SOLUTION TABLE FOR CURRENT COPING ITEMS

Internal Consistencies, EFA, Factor Loadings and Resultant 7-Factor Solution for Coping Strategies with FIML and Oblimin Rotation Used

Items and Factors	Factor Loadings	Mean (SD)	Range
Active Coping / Planning (alpha = .78)			
1. I concentrate my efforts on doing something the situation I am in.	.56	1.46 (.58)	0.0 – 2.0
2. I try to come up with a strategy about what to do.	.51	1.5 (.60)	0.0 – 2.0
15. I try to take action to make the situation better.	.64	.95 (.77)	0.0 – 2.0
21. I get comfort and understanding from someone.	.38*	.72 (.66)	0.0 – 2.0
22. I get help and advice from other people.	.44*	1.4 (.55)	0.0 – 2.0
Minimization (alpha = .42)			
9. I turn to tennis to tennis or other activities to take my mind off things.	.36*	.44 (.95)	0.0 – 2.0
10. I say to myself this isn't real.	.57	.20 (.52)	0.0 – 2.0
11. I say things to let my unpleasant feelings escape.	.47	.93 (.69)	0.0 – 2.0
12. I use alcohol or drugs to make me feel better.	.46	.56 (.78)	0.0 – 2.0
17. I look for something good in what is happening.	.55*	1.34 (.68)	0.0 – 2.0
24. I refuse to believe that it is happening.	.40	.85 (.52)	0.0 – 2.0
Spiritual (alpha = .74)			
4. I try to accept the reality of the fact that it has happened.	.42	.64 (.84)	0.0 – 2.0
6. I try to find comfort in my religion or other spiritual beliefs.	.90	.18 (.46)	0.0 – 2.0
17. I look for something good in what is happening.	.59*	1.34 (.68)	0.0 – 2.0
20. I pray or meditate.	.87	.17 (.48)	0.0 – 2.0
Humor (alpha = .85)			
5. I make jokes about it.	.87	1.19 (.78)	0.0 – 2.0
19. I make fun of the situation.	.86	.32 (.18)	0.0 – 2.0
Emotional Support (alpha = .77)			
7. I get emotional support from others.	.80	.73 (.72)	0.0 – 2.0
8. I try to get advice or help from other people about what to do.	.77	1.33 (.61)	0.0 – 2.0
21. I get comfort and understanding from someone.	.45*	.72 (.66)	0.0 – 2.0
22. I get help and advice from other people.	.48*	1.4 (.55)	0.0 – 2.0
25. I express my negative feelings.	.60*	.98 (.63)	0.0 – 2.0
Give-up (alpha=59)			
13. I give up trying to deal with it.	.67	.53 (.65)	0.0 – 2.0
9. I turn to tennis to tennis or other activities to take my mind off things.	.36*	.44 (.95)	0.0 – 2.0
27. I give up the attempt to cope.	.48	.92 (.43)	0.0 – 2.0
Self-blame (alpha = .64)			
9. I turn to tennis to tennis or other activities to take my mind off things.	.36*	.44 (.95)	0.0 – 2.0
14. I criticize myself.	.66	.23 (.50)	0.0 – 2.0
25. I express my negative feelings.	.58*	.98(.63)	0.0 – 2.0
28. I blame myself for things that happen.	.54	.72 (.66)	0.0 – 2.0

**Deleted due to loading on more than one factor—next page for detail.*
See next page for discarded items due to <.30 loading.

Deleted Coping Strategy Items due to Loading on More than One Factor

Items and Factors	Factor Loadings	Mean (SD)	Range
Active Coping / Planning (alpha = .78)			
21. I get comfort and understanding from someone.	.38*	.72 (.66)	0.0 – 2.0
22. I get help and advice from other people.	.44*	1.4 (.55)	0.0 – 2.0
Minimization (alpha = .42)			
9. I turn to tennis to tennis or other activities to take my mind off things.	.36*	.44 (.95)	0.0 – 2.0
17. I look for something good in what is happening.	.55*	1.34 (.68)	0.0 – 2.0
Spiritual (alpha = .74)			
17. I look for something good in what is happening.	.59*	1.34 (.68)	0.0 – 2.0
Emotional Support (alpha = .77)			
21. I get comfort and understanding from someone.	.45*	.72 (.66)	0.0 – 2.0
22. I get help and advice from other people.	.48*	1.4 (.55)	0.0 – 2.0
25. I express my negative feelings.	.60*	.98 (.63)	0.0 – 2.0
Give-up (alpha=59)			
9. I turn to tennis to tennis or other activities to take my mind off things.	.36*	.44 (.95)	0.0 – 2.0
Self-blame (alpha = .64)			
9. I turn to tennis to tennis or other activities to take my mind off things.	.36*	.44 (.95)	0.0 – 2.0
25. I express my negative feelings.	.58*	.98(.63)	0.0 – 2.0

Deleted coping strategy items with factor loading values less than .30

3. I try to see it in a different light to make it seem more positive.
16. I think hard about what steps to take.
18. I learn to live with it.
23. I do something to think about it less, such as go to movies, watching TV, reading, daydreaming, sleeping or shopping.
26. I use alcohol or drugs to help me get through it.

APPENDIX F
RESULTS OF ASSESSMENT OF NORMALITY

Assessment of Normality

Variable	skew	c.r.	kurtosis	c.r.
Current rank	-1.34	-5.29	1.80	3.55*
Threat	-.42	-1.64	-.66	-1.31
Control	-.10	-.39	-.22	-.43
SSP1	-.11	-.44	-.48	-.96
SSP2	-1.00	-3.97	.80	1.60
SSP3	-.73	-2.88	-.64	-1.28
Somatic anxiety	.65	2.6	-2.7	-5.4
Cognitive anxiety	.34	1.34	-.78	-1.54
Self blame	.02	.08	-.68	1.36
Give up	2.38	9.42	5.67	11.23*
Minimization	1.65	6.52	5.35	10.60*
Current coping item 1	-.57	-2.27	-.63	-1.25
Current coping item 2	-.791	-3.13	-.36	-.71
Current coping item 3	-.50	-1.97	-.70	-1.40

* Illustrates critical ration scores for variables that are beyond the 95th confidence interval > 1.96, 3/14 items is not a large proportion of variables affected.

APPENDIX G
CORRELATIONS OF CURRENT COPING ITEMS

Correlations

		cap1	cap2	cap3	cav1	cav2	cav4	cap4		
cap1	Pearson Correlation	1	.526(**)	.204(*)	.237(*)	.055	.123	.067		
	Sig. (2-tailed)	.	.000	.049	.022	.597	.237	.522		
	N	94	94	94	94	94	94	94		
cap2	Pearson Correlation	.526(**)	1	.170	.239(*)	.130	.227(*)	.159		
	Sig. (2-tailed)	.000	.	.101	.020	.213	.028	.125		
	N	94	94	94	94	94	94	94		
cap3	Pearson Correlation	.204(*)	.170	1	.323(**)	.130	.319(**)	.260(*)		
	Sig. (2-tailed)	.049	.101	.	.002	.211	.002	.011		
	N	94	94	94	94	94	94	94		
cav1	Pearson Correlation	.237(*)	.239(*)	.323(**)	1	.244(*)	.165	.139		
	Sig. (2-tailed)	.022	.020	.002	.	.018	.113	.181		
	N	94	94	94	94	94	94	94		
cav2	Pearson Correlation	.055	.130	.130	.244(*)	1	-.084	.036		

	Sig. (2-tailed)	.597	.213	.211	.018	.	.420	.732
	N	94	94	94	94	94	94	94
cav4	Pearson Correlation	.123	.227(*)	.319(**)	.165	-.084	1	.447(**)
	Sig. (2-tailed)	.237	.028	.002	.113	.420	.	.000
	N	94	94	94	94	94	94	94
cap4	Pearson Correlation	.067	.159	.260(*)	.139	.036	.447(**)	1
	Sig. (2-tailed)	.522	.125	.011	.181	.732	.000	.
	N	94	94	94	94	94	94	94
cap5	Pearson Correlation	.237(*)	.392(**)	.285(**)	.248(*)	.101	.263(*)	.226(*)
	Sig. (2-tailed)	.021	.000	.005	.016	.335	.010	.028
	N	94	94	94	94	94	94	94
cap6	Pearson Correlation	.138	.310(**)	.060	.025	.104	.174	.236(*)
	Sig. (2-tailed)	.184	.002	.567	.812	.321	.093	.022
	N	94	94	94	94	94	94	94
cap7	Pearson Correlation	.231(*)	.109	.253(*)	.127	.258(*)	-.004	.100

	Sig. (2-tailed)	.025	.297	.014	.222	.012	.969	.336
	N	94	94	94	94	94	94	94
cav11	Pearson Correlation	.059	.201	.170	.174	.255(*)	.038	.095
	Sig. (2-tailed)	.571	.052	.101	.094	.013	.714	.362
	N	94	94	94	94	94	94	94
cav12	Pearson Correlation	.037	.062	.032	.105	.733(**)	-.096	.023
	Sig. (2-tailed)	.722	.553	.759	.314	.000	.360	.825
	N	94	94	94	94	94	94	94
cav14	Pearson Correlation	.173	.254(*)	.354(**)	.167	-.006	.620(**)	.492(**)
	Sig. (2-tailed)	.095	.013	.000	.109	.953	.000	.000
	N	94	94	94	94	94	94	94
cap8	Pearson Correlation	.181	.216(*)	.328(**)	.235(*)	.030	.525(**)	.614(**)
	Sig. (2-tailed)	.081	.037	.001	.023	.778	.000	.000
	N	94	94	94	94	94	94	94
cav3	Pearson Correlation	.122	.221(*)	.147	.318(**)	-.080	.074	.059
	Sig. (2-tailed)	.240	.032	.158	.002	.442	.476	.575
	N	94	94	94	94	94	94	94

cav5	Pearson Correlation	.089	.179	.063	.092	.143	.096	.100
	Sig. (2-tailed)	.391	.084	.549	.380	.169	.355	.338
	N	94	94	94	94	94	94	94
cav6	Pearson Correlation	-.031	.012	.011	-.137	-.033	.077	.083
	Sig. (2-tailed)	.766	.906	.915	.188	.751	.462	.425
	N	94	94	94	94	94	94	94
cav7	Pearson Correlation	.165	.168	.089	.030	.130	.129	.054
	Sig. (2-tailed)	.111	.105	.393	.771	.213	.217	.603
	N	94	94	94	94	94	94	94
cav8	Pearson Correlation	.146	.121	-.021	.001	.114	-.258(*)	.042
	Sig. (2-tailed)	.160	.244	.840	.990	.276	.012	.689
	N	94	94	94	94	94	94	94
cav9	Pearson Correlation	.047	.183	-.080	-.043	-.027	-.093	-.098
	Sig. (2-tailed)	.656	.078	.445	.682	.799	.371	.346
	N	94	94	94	94	94	94	94
cav10	Pearson Correlation	-.102	.041	-.103	-.094	.134	.007	.129

	Sig. (2-tailed)	.329	.696	.325	.368	.197	.949	.216	
	N	94	94	94	94	94	94	94	
cav13	Pearson Correlation	.231(*)	.250(*)	.259(*)	.281(**)	-.128	.218(*)	.105	
	Sig. (2-tailed)	.025	.015	.012	.006	.217	.035	.315	
	N	94	94	94	94	94	94	94	
cav15	Pearson Correlation	.051	.153	.012	.085	.113	.049	.042	
	Sig. (2-tailed)	.626	.140	.908	.414	.278	.638	.686	
	N	94	94	94	94	94	94	94	
cav16	Pearson Correlation	-.040	.028	-.123	-.151	-.052	-.008	.192	
	Sig. (2-tailed)	.704	.791	.236	.146	.620	.942	.063	
	N	94	94	94	94	94	94	94	
cav17	Pearson Correlation	-.097	.104	-.067	-.075	.137	.163	.222(*)	
	Sig. (2-tailed)	.355	.319	.518	.475	.189	.116	.031	

	N	94	94	94	94	94	94	94	
cav18	Pearson Correlation	.066	.047	.078	.101	.171	-.083	.034	
	Sig. (2-tailed)	.529	.650	.458	.335	.099	.426	.746	
	N	94	94	94	94	94	94	94	
cav19	Pearson Correlation	.104	.031	.060	-.010	-.092	.022	-.031	
	Sig. (2-tailed)	.319	.766	.569	.923	.376	.830	.765	
	N	94	94	94	94	94	94	94	
cav20	Pearson Correlation	-.087	.035	-.095	-.064	.055	-.054	.148	
	Sig. (2-tailed)	.405	.741	.362	.538	.596	.603	.155	
	N	94	94	94	94	94	94	94	

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

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VITA

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